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COMMERCIAL FISHERIES REVIEW

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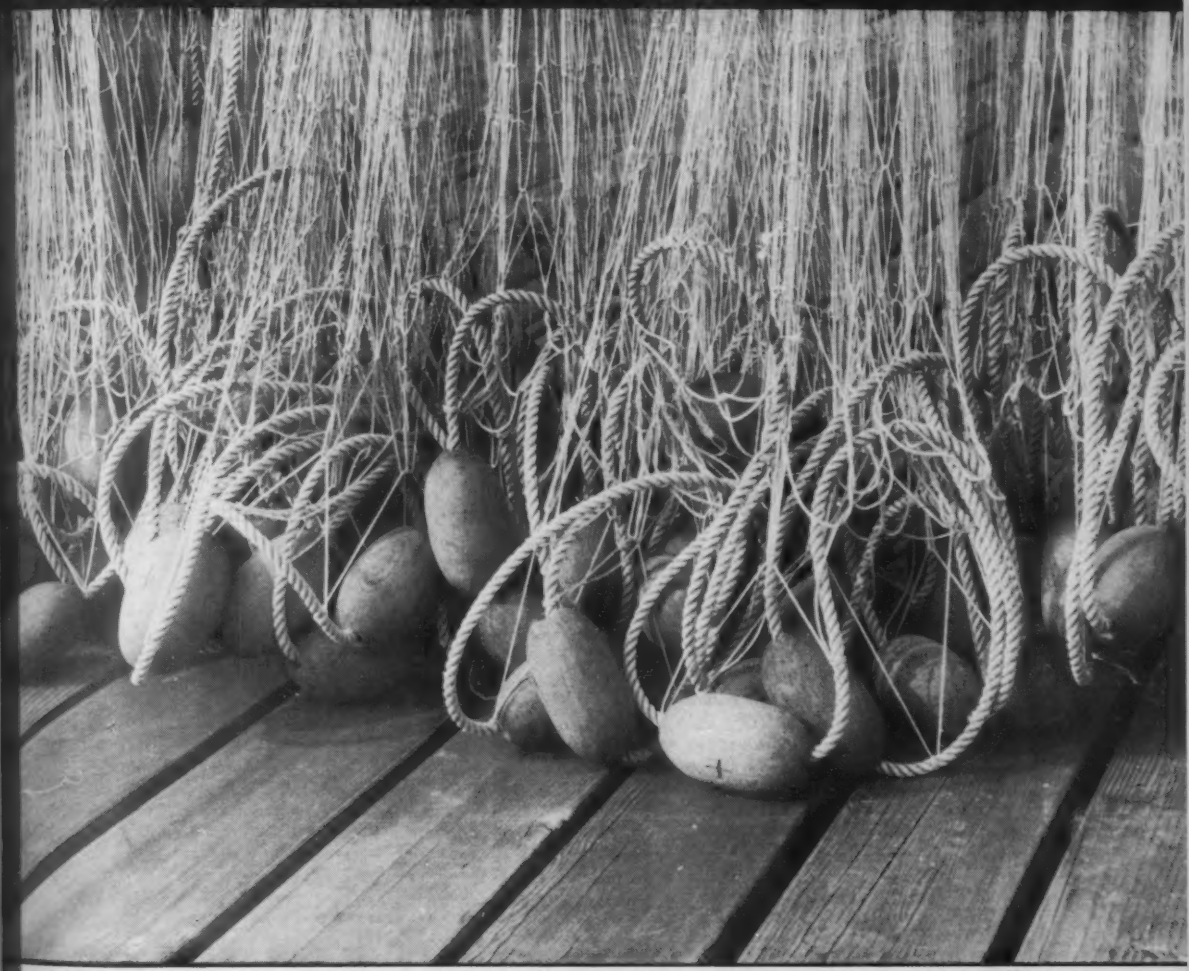

Vol. 8, No. 5 MAY 1946

FISH and WILDLIFE SERVICE
United States Department of the Interior
Washington, D.C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
J. A. KRUG, Secretary

FISH AND WILDLIFE SERVICE
ALBERT M. DAY, Director

COMMERCIAL FISHERIES REVIEW

A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES
PREPARED IN THE DIVISION OF COMMERCIAL FISHERIES

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Applications for COMMERCIAL FISHERIES REVIEW, which is mailed free to members of the fishery industry and allied interests, should be addressed to the
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Cover: Along the Pacific Coast from California to Alaska, preparations for summer salmon fishing are in evidence throughout the spring months. This is a chinook salmon gill net, characterized by large meshes and equipped with cedar "corks" or floats.

Source - Office of War Information.

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COMMERCIAL FISHERIES REVIEW

May 1946 Washington 25, D. C. Vol. 8, No. 5

THE ARMY'S WARTIME FISHERY RESEARCH

By Frank Piskur*

Although fish and fishery products have never occupied the place in American diets that they have in the diets of European and Asiatic peoples, the popularity of fish as a food is increasing in this country. Since eating habits show sectional, as well as national and individual, variations and are influenced by religious customs, fish is more favorably received in some parts of this country than in others.

Consumption of fish by the Army during World War II showed this sectional influence. Men's desire for fish was influenced by the peculiarities of the section of the country in which they had lived. Those from the West, parts of the Middle West, and from sections of the South did not consume much fish or fishery products, while troops from the coastal areas ate large quantities of a wide variety.

A considerable amount of a variety of fish and shellfish was available for Army use prior to and during the war. This included about twenty-five varieties of salt-water fish, nine varieties of fresh-water fish, and five species of shellfish. There were many more acceptable varieties in each of these groups, but because their supply was limited, they were not considered practical for Army feeding.

Many Army camps throughout this country were close enough to market centers and fisheries to permit the use of an abundant supply of various types of fresh and chilled fish. Since fishing is a seasonal operation, these camps filled their off-season demands for fish largely through the use of frozen fishery products. Thus the troops were assured of a constant supply of good seafood. For the camps located farther from the coasts, there was a limited supply of fresh-water fish as well as the cold-storage and frozen fishery products shipped from the Atlantic and Pacific seaboards.

The many varieties of canned fish and shellfish also supplied a large portion of the Army's requirements for fishery products. The extent of Government requirements for canned fishery products is evidenced by the large set-aside orders made by the War Food Administration. Amendment 7 to War Food Order 44, effective January 13, 1945, provided the following restriction on the 1944 pack of canned fish:

> "Seventy percent by weight of each canner's 1944 pack of salmon; red, pink, silver, chum, . . . is hereby established as his respective quota of the 1944 pack of such classes for sale or delivery to government agencies."

*Chemist, Fishery Technological Laboratory, Seattle, Washington, formerly Fishery Technological Liaison Officer at the Quartermaster Food and Container Institute for the Armed Forces, Chicago, Illinois.

This order also included a set-aside of 60 percent for king salmon and 55 percent for canned pilchard, Atlantic sea herring, Atlantic mackerel, and Pacific mackerel.

As the war progressed, demands for fishery products increased tremendously. The WFA set-aside requirements for canned fishery products from the 1945 pack were increased to 80 percent of most of the packs designated.

Because of the Army's great demand for fishery products and for protein foods in general, and in anticipation of a possible meat shortage, the Subsistence Research and Development Laboratory of the Quartermaster Corps, located in Chicago, Illinois, deemed it necessary to institute a research program to insure more efficient utilization of the present supply of fishery products and to investigate possible uses for the many species of fish that were abundant but were not being used, or were used only to a small extent. As a result of the eventual execution of this program, fresh, frozen, and canned fish were used in the A and B rations and in the new Ten-in-One ration, while the less expensive grades of canned fish were used extensively in prisoner-of-war feeding and for Philippine Scout rations.

Wartime development of fishery products received impetus from the need for production of adequate food for liberated countries. Certain types of fishery products have been used very successfully for relief feeding, because of their high nutritive quality, excellent digestibility, and low cost of production.

The Quartermaster Corps outlined its research and development program to accomplish the following objectives:

a. To increase the number and variety of fishery products utilized by the Armed Forces.

b. To develop uses for the many types of previously unutilized species of fish.

c. To develop new and improved fishery products; methods of handling, packing, and shipping, procurement and inspection; recipes for cooking; and standards of nutritional value and keeping quality.

In March of 1944, members of the Laboratory consulted with various research organizations to determine their attitudes toward this fishery program and to secure a man qualified to do the investigational work. Possibilities for the program were discussed at meetings held with representatives of these organizations, and served to interest various West Coast fishery groups in the undertaking.

The U. S. Fish and Wildlife Service expressed willingness to place some of its personnel at the Laboratory to work on specific fishery problems and offered the cooperation of its four laboratories at College Park, Maryland; Seattle, Washington; Ketchikan, Alaska; and Mayaguez, Puerto Rico. The agency also stationed one of its technologists at Chicago as Fishery Technological Liaison Officer to organize and coordinate various phases of the fishery research program. The eventual marked success of the program was due, in large measure, to the wholehearted cooperation of the Fish and Wildlife Service. Not only did it supply available technical information on fishery products, but it delegated several experts to participate actively in research.

Survey on Acceptability of Fish: To determine the amount of waste occurring when fish was served in Army camps and to offer suggestions for reducing this waste,

the Subsistence Research and Development Laboratory, in early 1944, instituted an extensive survey of the acceptability of fishery products at domestic military installations in the nine Service Commands. Reports of findings of this survey in approximately 400 Army messes may be summarized as follows:

a. Type of Fishery Product Desired: There was quite general agreement that fish served as boneless fillets, preferably from fairly large fish, were the most desirable. Many men expressed a preference for frozen fillets and none disapproved of them. Canned fish of all types were generally regarded as acceptable.

b. Species of Fish Desired: There was no unanimity as to the most popular species of fish. Canned salmon, shrimp, and flounders were selected by four different Service Commands as the most desirable species, while haddock, halibut, mackerel, and oysters were given as first choice by three Service Commands. Mackerel, on the other hand, was mentioned unfavorably by three Service Commands and shrimp, haddock, and cod by one each.

c. Method of Preparation Favored: Frying was generally given as first choice in cooking methods, with most camps preferring the use of a batter and nearly all recommending that the fish be served with some sort of sauce. The desirability of using different sauces from time to time to avoid monotony was frequently mentioned. For large fish, most reports showed that baking was a satisfactory second choice.

d. Quality of Fish: Of those commenting on the quality of fish when received, none complained of lack of freshness. Several specifically mentioned that no trouble had been encountered from receiving stale, or otherwise unsatisfactory, fish. Several comments implied, however, that there was a decided preference for frozen fish. One camp reported that iced fish was not acceptable and that only frozen fish was used, but no reason was given for this choice.

e. Recommendations for Increasing the Popularity of Fish: Most reports stressed the importance of methods of serving fish, and emphasized especially the desirability of having a variety of sauces available. Many of the reporting agencies felt that improvements in serving methods, together with increased knowledge of existing methods, by Army cooks provided the best approach to increasing the popularity of fish. It was quite generally felt that publication of new recipes represented the best way to disseminate such new information.

Most Service Commands recommended pamphlets and posters for increasing the popularity of fish. Two reporting agencies, however, were quite emphatic in their belief that such psychological approaches would lead to little or no success.

The conclusions of this survey were:

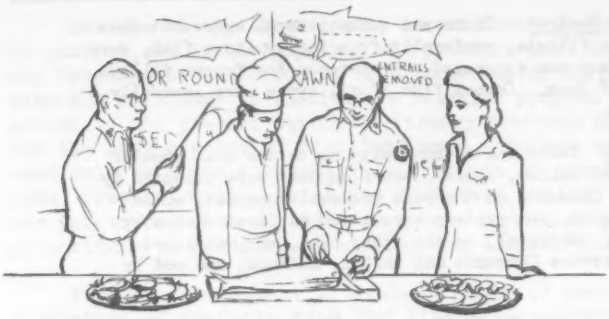
1. Filleted fish, prepared in pieces, suitable for individual servings, were preferred.

2. Thirty pounds of fish per one hundred men was the most desirable proportion for serving.

3. The most popular method of preparation was deep-fat frying, preferably with flavorful sauces.

4. Special instructions with respect to proper preparation of fish should be given to cooks and mess sergeants.

As a result of this survey, it seemed advisable to prepare a fish reference manual for Army use. With the help and suggestions of members of the Subsistence Research and Development Laboratory, the Fish and Wildlife Service's Technological Section prepared the fish Cookery and Reference Manual[1] for Army use. This manual contains information concerning the marketing and food value of fishery products and provides instruction for the purchase and preparation of all fish and shellfish available for military feeding. The manual is now being used by the Subsistence School, Chicago Quartermaster Corps.



SCHOOL FOR BAKERS AND COOKS

Development of Canned Lake Fish: In the latter part of 1944, samples of carp and buffalofish,[2] packed in a style similar to that of canned flaked tuna, were submitted to the Laboratory by a Minnesota canning company. After several years of work on the canning of carp and buffalofish, this company had finally developed a product it considered suitable for military use. The samples submitted were carefully examined, and were found to be acceptable in flavor and color, but it was suggested that the texture of the fish could be improved. After further experimentation with the brining and cooking procedures, with the Laboratory acting in an advisory capacity, the company submitted a product which was considered satisfactory in flavor, color, and texture.

Although carp and buffalofish had been used commercially only to a limited extent, the Laboratory thought it advisable, in view of the critical shortage of protein foods, to utilize acceptable food products of this type from all potential sources. It estimated that, in excess of current fresh market demands, 50,000,000 pounds of round carp and buffalofish from Minnesota and surrounding States would be available annually for food purposes and that canning of these species would make available approximately 10,000,000 pounds of highly nutritious canned fish.

Chemical and vitamin analyses of canned lake fish made in February 1945 showed it to be a highly nutritive product, comparing favorably with canned tuna in this respect.

Early in 1945, following the canning of a successful test pack of 5,000 cans of this product by the Minnesota company, the Army contracted for the purchase of 150,000 cans (14 oz. net) for Service use and for foreign relief feeding. The contract provided also for the purchase of an additional 50,000 cans (14 oz. net) of a canned ground fish product, packed without the addition of cottonseed oil, which would be used exclusively for foreign relief feeding.

1/Subsistence School Text No. 28, Ed. 1, July 1945.
2/Research Report No. 6-45, Fish, Lake, Canned, Tuna Style, April 27, 1945.

Preservation of Salt Fish: A Subsistence Research and Development Laboratory research project initiated in March 1944 was directed towards retarding rancidity in salt-cured fish products. Although these products have long been one of the basic sources of protein food for lower income populations of the world, their use has been restricted largely to fish of non-oily species such as cod. Fish of high fat content: herring, mackerel, mullet, pilchard, etc.; could not be salt-cured profitably because, to prevent rapid deterioration, salt-cured products of this type require storage at temperatures about 35° F. If they are held at 70° F., or higher, rancidity occurs within a few days, and the products become inedible within a few weeks.

In undertaking this project, the Laboratory hoped to aid in civilian relief feeding by making possible the use of protein foods which heretofore could not be shipped to tropical and semi-tropical areas without refrigerated shipping and storage space. In correspondence with the Laboratory the WFA had emphasized the importance of such research to government agencies purchasing food for relief and other purposes.

The problem was primarily that of preventing or retarding the development of rancidity in the oil of the fish. Therefore, stabilization of the oils by means of antioxidants was considered the most practicable solution. Data accumulated by the Laboratory on the use of antioxidants in fats and oils, particularly lard and shortening, were particularly helpful in this work. The following technique was adopted:

> An antioxidant is dissolved in a carrier of edible fat of a type solid at room temperature and relatively resistant to oxidation because of its chemical nature. The fish, after completion of the salting process, are dipped in the liquified fat which, upon cooling, forms a thin, sold fat coating. During storage, the fish oil, upon liberation from the fish, is absorbed into the coating and thus obtains the benefit of the protective action of the antioxidant in the coating.

Subsequently it was found that, in addition to oxidative rancidity, bacterial and enzymatic activity caused both rancidity and protein decomposition, particularly at temperatures from 80° to 100° F. Therefore the use of approved, non-toxic substances which would retard bacterial and enzymatic activity, in combination with the antioxidant-coating in the salt employed to salt-cure the fish was also investigated.

A preliminary laboratory-scale experiment on salt-cured herring provided definite indication of the value of the modified stabilization process. A subsequent laboratory-scale experiment on salt mackerel demonstrated that the process definitely stabilized the salt fish for a period of months. A detailed report of this experiment was presented in Research Report No. 15-45, June 8, 1945. As a result of this test, it was predicted that six months additional storage life, at room temperatures, could be obtained before products would become rancid to the point of inedibility. It was, therefore, concluded that a commercial-scale test was warranted.

The War Food Administration offered to finance such a test on salt brine-cured herring. Accordingly, a test pack of 50,000 pounds of herring was prepared in Gloucester, Massachusetts, in March 1945. Along with the stabilized product,

untreated fish were included in the pack as controls. Portions of the pack were being stored under various controlled temperature conditions, and preliminary examinations indicate definitely superior keeping qualities in the stabilized portion of the pack. These samples were in storage under observation in September 1945, and the test was expected at that time to be completed in eight or ten months.

The stabilization technique required little change from normal methods of production of salt fish products. Integral features are:

a. The incorporation of 4.5 pounds "Brino" (50 percent magnesium benzoate and 50 percent benzoic acid) or other approved, non-toxic, equally effective preservative, per 1,000 pounds of salt. This is equivalent to a 0.1 percent concentration based on weight of the salt plus the fish, using 30 pounds of salt per 100 pounds of fish. The salt-preservative blend is employed in the same manner as ordinary salt in normal salting operations.

b. Coating the salted fish with an approved vegetable fat, into which has been blended 0.3 percent (by weight of fat) of nordihydroguaiaretic acid or other equally effective antioxidant.

The cost of stabilization should not exceed two cents per pound of the final product, one cent per pound for materials used, and a similar cost for the additional handling entailed. The preservative is available in relatively unlimited quantities, and the antioxidant (nordihydroguaiaretic acid) is available at present in a quantity sufficient to process 400,000 pounds of fish per day. Since only three pounds of vegetable fat are required per 100 pounds of fish, the availability of vegetable fat should not prove a problem.

The War Food Administration and the Subsistence Division of the Office of the Quartermaster General indicated both current and postwar needs for huge quantities of salt fish for civilian feeding purposes, particularly in the Philippines. Both agencies have asked for fish capable of being shipped and stored without refrigeration.

Inspection and Procurement of Canned Salmon: To assure procurement of sufficient quantities of canned salmon from the 1945 pack, the Office of the Quartermaster General requested that an investigation be undertaken to determine whether any changes were needed in the Federal specification for this product. The Subsistence Division indicated that Army requirements for canned salmon were such that all wholesome products of adequate keeping quality should be accepted. Accordingly, representatives of the Laboratory conferred with representatives of the National Canners Association, the War Food Administration, the Seattle Army Service Forces Depot Veterinary Division, and the California Quartermaster Depot, concerning the matter.1/

The importance of the canned salmon investigation was magnified when, because of anticipations of a limited run of Alaska red salmon, the 1945 pack of Alaska salmon was estimated at only 5,000,000 cases, which was somewhat below average, although higher than the 1944 pack of 4,856,000 cases. Total military requirements were estimated at approximately 3,000,000 cases (140,000,000 pounds) or approximately 60 percent of the anticipated pack. Since only 52 percent of this pack could be obtained without some change in the present procurement program, it was necessary to find some means of obtaining the additional 8 percent.

1/Research Report 13-45, "Investigation of Anticipated Supply of Canned Salmon from 1945 Pack Acceptable for Army Purposes," May 16, 1945.

At a joint cutting demonstration held in the Salmon Inspection Laboratory of the National Canners Association, in Seattle, Washington, cans of the various species, at quality ranges, were opened, the contents examined, and quality grading demonstrated. Products of the minimum quality acceptable to the Army, and products of lower quality acceptable to the WFA, were demonstrated.

As a result of this demonstration, it was found that the present Army minimum standard, based upon Federal Specification PP-5-31a, July 29, 1941, as amended May 1942, was being interpreted by the Army Veterinary Inspection group to include all grades of canned salmon considered suitable for food for the United States military personnel. Reduction of quality standards governing inspection and procurement of canned salmon for Army use was, therefore, considered undesirable.

Failure to obtain sufficient canned salmon from the previous packs had not been due to unnecessarily high quality standards. There had been more than sufficient canned salmon of the desired quality to meet Army needs. Rather, the failure to obtain a sufficient amount of acceptable canned salmon was due largely to the canners' reluctance to segregate rejected codes (specific divisions marked with a "code" number) from a lot even when the greater portion of the lot was acceptable to the Army. Since the canner receives the same price regardless of whether a lot meets Army requirements, provided it meets WFA minimum requirements, there is no financial inducement to the packer to segregate codes rejected by the Army.

Under the set-aside order, there was a possibility that the packer might retain the best 20 percent of his pack for the civilian market. This Laboratory recommended that if it were found later in the season that packers were not offering the best 20 percent of their pack for Army procurement, the present set-aside procedure be modified to permit the Army to select its requirements from the entire pack.

However, the Laboratory suggested that the Office of the Quartermaster General ask the Commodity Credit Corporation to make a formal request that the canned salmon industry adopt a program of segregating codes rejected by the Army from lots containing codes of quality acceptable to the Army.

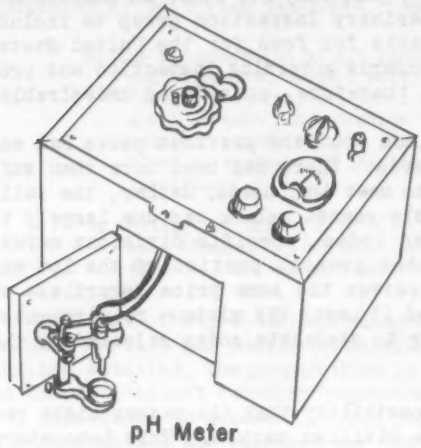
The Laboratory suggested that an additional 19,000,000 pounds of good quality canned salmon would be available to the Army if packs prepared in the standard commercial half-pound cans were used. Also, it was suggested that, if salmon were required for civilian relief feeding, a lower grade than that specified for Army use be used.

Search for a Freshness Index for Fish Fillets: The Army Quartermaster Corps purchased fish for the Armed Services through the Veterinary Corps fish inspectors. All inspection tests were organoleptic, consequently, the quality of the fish purchased depended entirely upon the judgment of the individual inspector. Organoleptic observations have been the only generally accepted criteria for judging the freshness of fish, and such tests have not been considered too accurate. It was believed desirable, therefore, to aid Veterinary Corps Inspection to insure the purchase of fresh, good quality fish for the Armed Services by devising an objective test to replace or supplement the organoleptic examinations.

Any test devised would necessarily have to be simple, rapid, and economical; also, it would have to be of such a nature that it would not mutilate the sample, rendering it unfit for sale. It is believed that if the pH value (relative acidity

or alkalinity) of fish flesh could be correlated with fish freshness, such a test would approach very closely the requirements of an ideal test. The pH determinations employing a pH meter are simple, rapid, and accurate, yet the samples are not destroyed.

In September 1944, the Laboratory requested the cooperation of the U. S. Fish and Wildlife Service in making surface pH tests to determine whether they would be of value to Army Veterinary Corps Inspectors as a basis for fish purchases, and to attempt to further simplify the tests.



pH Meter

Accordingly, the United States Fish and Wildlife Service detailed one of its technologists to conduct experiments and apply the test to the types of fish purchased by the Army at Gloucester, Mass. These experiments were conducted through September, October, and November 1944.

Of the various fish tested, the surface pH test was found to have some possibility of value as a freshness index for fillets of haddock, whiting, and dabs, but to be of questionable value for pollock, and to have no value for cod, grayfish, and rosefish. It was found, also, that the limitations of the test were quite serious:

a. It applied only to fish that had never been frozen. This is the case because erratic pH changes, not in any way connected with freshness, occur during freezing.

b. It indicated only the spoilage that occurred after the filleting process. Spoilage taking place prior to filleting could not be determined, since the pH values of new fillets would give no more indication of freshness than those on composite samples or internal flesh. Because the filleting operation makes a fresh cut, a surface pH taken immediately after filleting would thus be an interior rather than a surface test.

c. It may sometimes be affected by fillet dips. On the Atlantic Coast and, to a small extent, on the Pacific Coast, fillets are dipped in brine after the filleting process. Occasionally, alkaline dips are used to enhance the color of the product. If surface pH were used as a measure of freshness, any of these dips would affect the test markedly.

The data indicated further that there was no definite pH at which the limits of edibility could be set. Dyer, Sigurdsson, and Wood (1944) and VanDeurs and Hoff-Jorgensen (1936) suggested 7.5 as the upper limit for cod. In this present study, pH 7.5 in no case was considered a sufficiently low limit for edibility.

As a result of these experiments, and after thorough consideration of the limitations discussed above, it was shown that the surface pH test was not of practical value for Army use in the inspection of fish. From the standpoint of theoretical knowledge, however, these experiments proved of great value. They furnished additional information concerning the nature of fish spoilage and should prove useful for further laboratory research.

Evaluating Fishery Products for Foreign Relief: Assistance was requested by the War Food Administration, charged with the purchase of fish and fishery products for relief feeding, in evaluating the acceptability and suitability of many fish products offered for purchase for foreign relief feeding. Such products as canned squid, canned ground pilchard and menhaden, canned ground cod waste, brine-cured fish, and similar items, practically unutilized domestically because of their low acceptability to the American taste, were accordingly evaluated by the Laboratory.

When it was determined that certain of these products would be acceptable, several hundred million pounds of low cost protein food, and otherwise unutilized fish, were made available for relief feeding. Equally important was the elimination of products which would not be acceptable or which would not have the keeping quality necessary for shipment and storage before use.

Examination of Captured Enemy Fish Rations: A considerable number of captured Japanese and German fish rations were examined and evaluated with comparable types of American fish rations. In general, regular Japanese commercial products, such as canned salmon and tuna, were found to be acceptable in appearance and taste. Most of the military rations, however, were seasoned with a sweet, spicy sauce, which imparted a reddish-brown coloration to the products, rendering them unacceptable generally to American tastes.

With a few exceptions, the Japanese items seemed wholesome and nutritious. A few products such as whale, canned or dried squid, and dried sardines, however, though nutritious, did not possess an appetizing appearance. Because they were packed with such vegetables as hog rhubarb, bamboo, and seaweed, which are not commonly found in the American diet, some of the fish items were not considered generally acceptable. On the whole, the can vacuum was low, probably because of excessive filling.

The number and variety of fish items were greater in the Japanese rations than in the German rations. The German fish rations were considered as good as the comparable type of commercial American pack.

It is impossible to evaluate accurately the results of the research and development undertaken on fishery products. The whole program had such a late beginning that its results have not been practiced long enough to afford an exact index to its value. A considerable portion of the results was offered in the form of recommendations to other government agencies responsible for particular phases of the Army and civilian feeding programs. Thus, the value of the program depends largely upon the extent to which these agencies have applied these recommendations and findings.

It is believed, however, that the main contributions of the fishery research program may be summarized as follows:

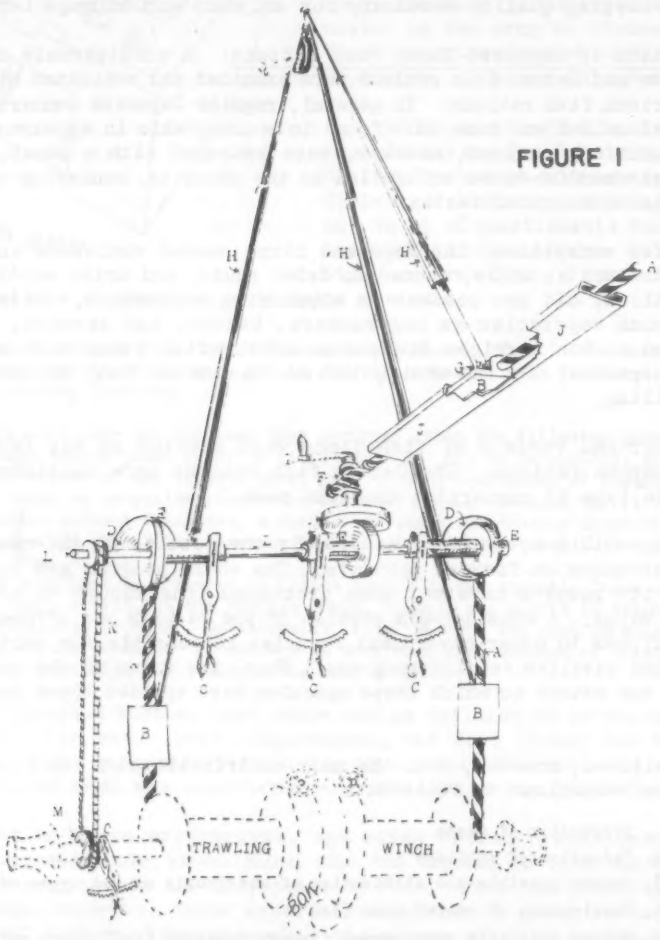
1. Prevention of waste
2. Reduction of spoilage
3. Making possible the utilization of previously unused types of fish
4. Development of canned lake fish
5. Making available more canned fishery products for foreign relief feeding

A TRIPOD DERRICK FOR SMALL FISHING VESSELS

By Boris O. Knake*

The present types of mast and boom rigs, with guys and fastenings, often interfere with operations on the decks of smaller fishing vessels and with the hauling or setting of lines and nets. The tripod derrick, illustrated in Figure 1, offers a method of eliminating many of the shortcomings of present installations. Its use, however, necessitates the construction of a pilot house that is reinforced to carry the load of the hoist.

FIGURE 1



*Fishery Engineer, Fishery Technological Laboratory, Boston, Mass.

The hoist consists of three booms. The upper ends of the booms are fastened together in a universal joint. The lower ends of each boom are fixed to a shoe which, in turn, is held in a track in which the shoe slides freely. Each shoe is threaded to ride a screw. As the screw is turned, either by hand or by a power take-off, the shoe slides to a new position on the rail. This movement raises or lowers the hoist or swings it to either side, thus bringing the block and tackle into any desired position. The hoist will hold steady at all times.

Figure 1 is a diagrammatic view of the installation as seen from the operator's post inside the pilot house.

HHH - Three booms forming a tripod.
G - Goose-neck by which boom is joined to shoe.
B - Shoe that slides in track J which receives it power from screw shaft A.
J - Shown only for horizontal rail that is affixed to roof of pilot house.

The two vertical tracks are omitted from the diagram for clarity. Other parts of the diagram show a system of transmitting power to the three screws AAA. Other methods for transmitting power may be employed if desired. In the illustration, the winch supplies force through the clutch O to the cogwheel M by means of the chain H, which turns the end-shaft L. Three reversible disc clutches in this shaft activate the screws AAA. The handles PPP (two are hidden in the shafts by the discs DDD) can be used for hand adjustments of the hoist when the power is off.

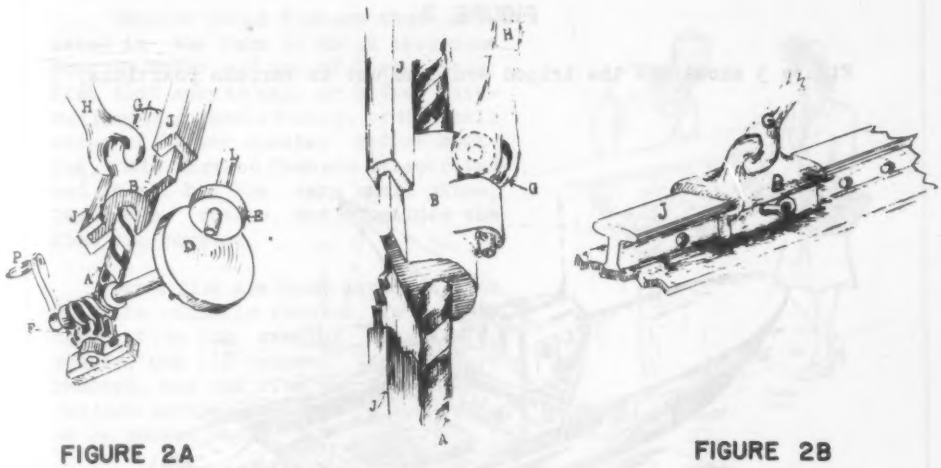


FIGURE 2A FIGURE 2B

FIGURE 2

Figures 2, 2A, and 2B show three suggested construction details of the shoe and rail assembly.

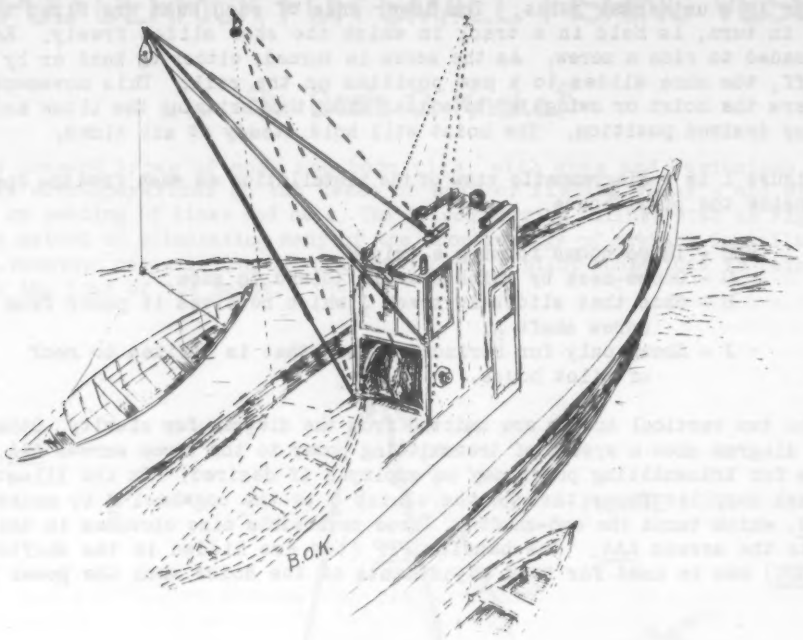


FIGURE 3

Figure 3 shows how the tripod would adjust to various positions.

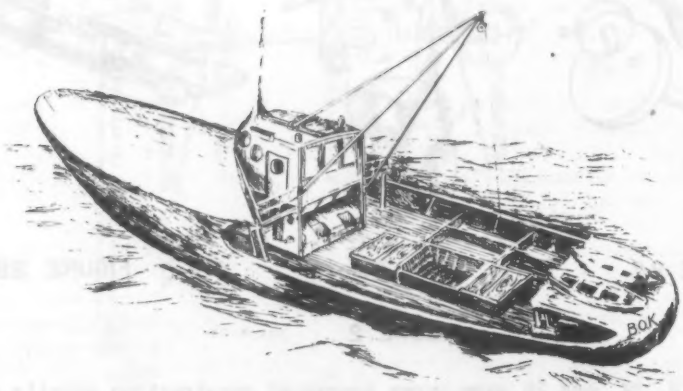


FIGURE 4

Figure 4 illustrates a futuristic version of an otter trawler that combines designs of East and West Coast fishing vessels.

A - Main worm screw
B - Traveler
C - Clutch levers
D&E - Disc clutch, reversible
F - Worm screw transmission
G - Goose-neck
H - Tripod legs
J - Slide track
K - Chain drive
L - Chain gear sheave
M - Chain gear sheave with clutch
O - Clutch on winch shaft
P - Hand crank (removable)
Q - Block for hoisting

MARKET FORMS OF FISH

Fresh (refrigerated) fish and completely frozen fish should be equally good if the freezing is done by the modern methods now well known to the industry. Both are marketed in a variety of convenient forms, as follows:

Whole or round fish are those marketed in the form in which they come from the water, and are of three kinds: Fish that keep as well or better without freezing, small fishes, or the small sizes of larger species. Before cooking, whole or round fish are eviscerated and in all but the very small sizes, the heads, scales, and sometimes the fins are removed.

Drawn fish are those marketed with only the entrails removed. To prepare these fish for cooking, the heads, scales, and (if desired) the fins are removed, and the fish may be split or cut into serving portions if too large to be cooked whole.

Dressed fish have had the head and entrails removed and the tail and fins may be cut off. If dressed fish are large they may be cut into pieces in preparation for cooking. Very large dressed fish are sometimes marketed in pieces.

Conservation Bulletin No. 38

FISHERY RECEIPTS AT SEATTLE, 1945

By E. C. Hinsdale*

Landings and wholesale receipts of fresh and frozen fish, shellfish, and livers at Seattle during 1945 totaled 89,798,000 pounds, 32 percent over the 1944 figure of 68,140,000 pounds, and the largest volume of receipts recorded by the local Market News Office since it was established in 1939. These fishery products included local landings and receipts by the halibut exchange and the salmon cooperative, direct local receipts by wholesalers and deliveries from non-local sources, coastwise vessel receipts from Alaska, and imports received from Canada.

Excluding liver receipts, the ex-vessel landings and other deliveries by waterborne traffic totaled 64,514,000 pounds or 76 percent of the total fish and shellfish figure of 84,828,000 pounds, with the remaining 24 percent, or 20,314,000 pounds, being made by truck, rail, and express.

Seattle's principal sources of supply were the waters of Washington, Oregon, and Idaho, which supplied over 70 percent of the total receipts or 62,801,000 pounds; Alaska, 25 percent or 22,410,000 pounds; British Columbia, 5 percent or 4,251,000 pounds; and the following areas which contributed less than one-half of one percent: Gulf States, Manitoba, and New York (Table 1). With the exception

Table 1 - Receipts by Source - 1945

Source	FRESH			FROZEN		
	1945	1944	Change from 1944	1945	1944	Change from 1944
	Pounds	Pounds	Percent	Pounds	Pounds	Percent
Local[1/]	62,801,000	50,874,000	+ 23	-	-	-
California	48,000	10,000	+380	-	-	-
Gulf States	245,000	59,000	+315	-	-	-
New York	8,000	4,000	+100	-	-	-
Alaska	604,000	1,079,000	- 44	21,806,000	13,816,000	+58
British Columbia	3,743,000	1,960,000	+ 91	508,000	308,000	+65
Manitoba	-	-	-	35,000	31,000	+13
Total	67,449,000	53,986,000	+ 25	22,349,000	14,154,000	+58

1/Washington, Oregon, and Idaho.

of Alaska, all sources of supply showed outstanding gains, the direct reverse of 1944. As in the previous year, Seattle again received a carload of frozen whitefish from Canada, indicating a small but possible growing interest in prime freshwater fish of the prairie region.

The sharp increase of almost 21¾ million pounds over 1944 in Seattle's receipts was due, in large part, to two developments. Of first importance was the increase of over 7¾ million pounds in salmon receipts. The year 1945 was a pink salmon year in Puget Sound and receipts of this species totaled 3,790,000 pounds compared to 88,000 pounds for the previous year. In addition, the purse-seine and gill-net operations for chinook and chum salmon showed considerable improvement. While the 1945 trolling operations and reported local landings of chinook salmon were not up to expectations, declining 8 percent, the receipts of silver salmon, of

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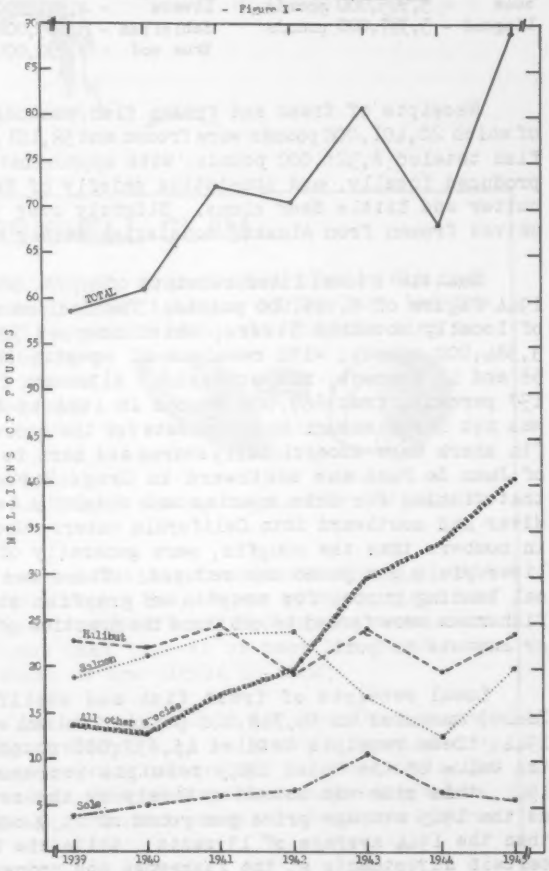
which almost 1-1/3 million pounds were caught by troll gear, were sufficiently heavy to offset the disappointing chinook situation. As a result, the over-all receipts of troll-caught salmon increased from 2,395,000 pounds in 1944 to 2,907,000 pounds in 1945, a gain of 21 percent.

Second, the receipts of true cod, 2,090,000 pounds, and rockfishes, 14,493,000 pounds, represented increases of 226 percent and 158 percent, respectively. These bottomfish were caught and landed almost exclusively by otter-trawl vessels, with the halibut fleet and small shark or line craft accounting for only a minor portion of the total bottomfish receipts. The catch per boat of these species was generally high since highly productive fishing grounds were encountered during the 1945 operations of the trawl fleet in both inside and off-shore waters. The fishing effort was further aided and encouraged by the upward adjustment of a number of OPA's price levels for the fisherman and the processor. The influence of the increased otter-trawl catch is evident from Figure 1, on which are plotted total landings from 1939 through 1945. On this chart, "all other species," including mainly species taken by otter-trawl vessels, shows the most impressive increase of any group.

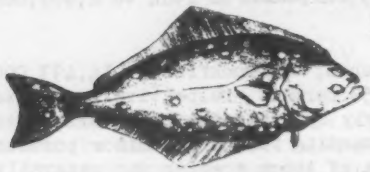
LANDINGS OF FISHERY PRODUCTS AT SEATTLE, 1939 - 1945
- Figure 1 -



Receipts of halibut influenced the over-all picture to some extent. During 1945, the catch limit of halibut was raised through international agreement to 52½ million pounds, an increase of 1½ million pounds over the 1944 limit. This was reflected to some extent at Seattle where local landings of fresh halibut increased from 11,744,000 pounds in 1944 to 12,425,000 pounds in 1945, a gain of 6 percent.

Alaska ports again received the major portion of the halibut catch by United States vessels, such landings being almost twice the amount landed at Seattle, principally because the vessels operating from Alaska bases could make many more trips to the banks than could be accomplished through the longer haul to Seattle. This was made possible through the removal of the "lay-over" restrictions in effect in 1943. Consequently, the largest gain in Seattle's receipts of this species lay, not in the deliveries of fresh halibut, but in the receipts of frozen stocks. Alaska shipped almost 10½ million pounds of frozen halibut via Seattle for distribution in the United States as compared to 6¾ million pounds in 1944, an increase of 56 percent.

In past years, the bulk of Alaska halibut had been trans-shipped to many eastern markets via Prince Rupert, Canada, in bond. The diversion of such shipments to Seattle in 1945 was occasioned by inadequate cold-storage space and lack of handling equipment at Prince Rupert, together with a critical shortage of suitable rail cars and other shipping facilities necessary for the rapid movement of large volumes of frozen stocks.



The year's total receipts of 89,739,000 pounds were composed of 39 classifications, 10 of which accounted for approximately 95 percent of the total weight. Heading the list of items which contributed most heavily to the year's receipts was halibut with 23,339,000 pounds, 26 percent of the total receipts. In second place, was salmon with a total of 20,017,000 pounds or 22 percent, and in third place, were rockfishes with 14,493,000 pounds or 16 percent. Following these items were:

Sole - 5,905,000 pounds	Livers - 4,971,000 pounds	Oysters - 3,402,000 pounds
Lingcod - 5,337,000 pounds	Sablefish - 3,809,000 pounds	Crabs - 1,510,000 pounds
	True cod - 2,090,000 pounds	

Receipts of fresh and frozen fish, excluding livers, totaled 78,502,000 pounds, of which 20,401,000 pounds were frozen and 58,101,000 pounds fresh. Receipts of shellfish totaled 6,326,000 pounds, with approximately four-fifths of this amount being produced locally, and consisting chiefly of Pacific oysters, Dungeness crabs, and butter and Little Neck clams. Slightly over 362,000 pounds of shellfish were received frozen from Alaska, consisting mainly of clams, crabmeat, and shrimp meat.

Seattle's total liver receipts of 4,971,000 pounds were 17 percent less than the 1944 figure of 5,985,000 pounds. The decline was caused by a decrease in receipts of locally obtained livers, which dropped 36 percent, from 5,316,000 pounds to 3,384,000 pounds, with receipts of soupfin shark and grayfish livers decreasing 56 and 48 percent, respectively. Although frozen livers from Alaska increased 137 percent, from 669,000 pounds in 1944 to 1,586,000 pounds in 1945, this gain was not large enough to compensate for the decrease in the local production. Soupfin shark were exceptionally scarce and hard to obtain in the waters off the Straits of Juan de Fuca and southward to Grays Harbor. Some shark fishermen reported that fishing for this species was slightly better off the mouth of the Columbia River and southward into California waters. Grayfish, while somewhat more plentiful in numbers than the soupfin, were generally of very small size, consequently, the liver yield per pound was reduced. There was no market in Seattle, or other local landing ports, for soupfin or grayfish shark carcasses, with the result that fishermen were forced to continue the practice of dumping stripped carcasses at sea or enroute to port.

Local receipts of fresh fish and shellfish (from Washington, Oregon, and Idaho) amounted to 59,718,000 pounds, valued at $7,127,000 to the fishermen. In 1944, these receipts totaled 45,632,000 pounds, valued at $5,912,000. Although the value of the total 1945 receipts increased almost 1¼ million dollars over 1944, this rise was caused entirely by the over-all increase of local receipts, as the 1945 average price per pound of 11.9 cents was 1.1 cents or 8 percent less than the 1944 average of 13 cents. While the Office of Price Administration made certain adjustments at the fishermen and processor price levels during 1945, they were of such character they did not tend to affect the general price of fish.

During most of the war years, OPA's price ceilings tended to act largely as a "floor." However, during the latter part of 1945, in infrequent instances, fishermen accepted returns below ceiling prices. Such cases, rare for the most part, influenced the drop in the over-all average price per pound.

During 1945, the heaviest deliveries of fishery products were made during the spring and summer months of May, June, and July. During May, the heaviest monthly receipts of shellfish and livers were made totaling 854,000 and 1,165,000 pounds of these items, respectively. July accounted for the greatest monthly volume of fresh and frozen fish, with a total of 10,891,000 pounds. June was the heaviest month for total fish and shellfish items, aggregating 11,403,000 pounds, and it led also in monthly receipts of fish, shellfish, and livers with a total of 11,961,000 pounds. During the preceding years, June was the heaviest month for all classifications, receiving almost 9½ million pounds in 1944 and 12⅜ million pounds in 1943.

THE HARD SHELL CLAM

The quahog, round clam, Little Neck, or hard shell clam is the most abundant on Middle Atlantic shores. The fisheries of New York and New Jersey yield between 2 and 3 million pounds each; the Virginia clam industry is only slightly less productive, with a yield of nearly 2 million pounds. Small quantities are taken in Delaware, Maryland, and North Carolina.

The bulk of the clam catch is sold fresh; the balance is canned--as minced clams, as chowder, or as clam cocktail.

Hard shell clams live in coastal waters, from almost the high tide level to depths of more than 50 feet. The deeper growing clams are taken by dredging or with tongs (the New York fishery is carried on entirely by tonging), while clams that live in or near the tidal zone are dug out of the sand with rakes or are picked by hand.

Because hard shell clams are well adapted to cultivation and grow within a wide depth range, the fishery could be greatly developed by extensive farming. In practice, however, cultivation has been neglected and pollution has been tolerated in otherwise good clam-growing areas; as a result only a fraction of the potential value of the clam resource is realized.

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FISH JAW OIL

By Joseph F. Puncochar*

Fish jaw oils have been used for centuries as lubricants for precision instruments. Manufacturers of horological instruments are well acquainted with the fine lubricating properties of oil of this type. Proper functioning and accuracy of delicate mechanisms require that the lubricant possess the following properties:

1. It must not oxidize rapidly
2. It must not evaporate, creep, or gum
3. It must be free-flowing at low temperatures

Properly refined fish jaw oil possesses all of these properties.

Although the demand for oil of this type is limited because of the small amounts necessary to lubricate precision instruments, it, nevertheless, contributes much to the precision instrument industry.

A long-established manufacturer of fish jaw oil, possibly the only producer in this country, indicated that during the past five years nearly the entire production of this oil was set aside for use in lubricating mechanisms of instruments used for military purposes.

Raw materials for the manufacture of fish jaw oil were formerly secured from the porpoise and blackfish. At the present time, however, blackfish are the sole source of raw material. The principal source of supply of blackfish is in the region of Cape Cod. The animals are attracted by the squid, upon which they feed. They are captured by driving them to shallow beaches where they are lanced to death.

Porpoise

Jaw oil is obtained from the jaw and jaw-pans of the animal. The lower jaw is cut off, and the jaw-pans are carefully removed. The melon, or junk, in the head of the blackfish also contains oil of similar properties. The melon is a fatty mass on the top of the head, extending from the spout hole to the end of the nose and weighing about 25 pounds. Jaw-pans and melons are washed free of blood, minced, and made ready for rendering.

The usual practice is to cook the head matter (melons and jaw-pans) of blackfish in fresh water. About 15 gallons of water is placed in the pot, the fat is added, and the whole is heated gently by a low fire. It is important that the temperature of extraction be not allowed to exceed 180° F. After extraction, the mixture is allowed to cool overnight and the oil is then skimmed off. The average yield of oil from a single blackfish head is about two gallons.

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In the manufacture of fish jaw oil, much depends upon the freshness of the raw material at the time the oil is rendered and the freedom of the extracted oil from adulterants (such as blubber oils) and foreign matter. Fresh raw material produces a much better oil than that which is partially decomposed. A peculiarity of oil of this type is that it improves with age. For this reason, oils are often a year or two old before marketing. More recently, however, it has been found that the process of refining the oil can be hastened through subjecting the oil to low temperatures to destearinate it. The oil is subjected to three successive degrees of freezing, each stage being at the temperature that will take out additional stearin. After refining, the oil is stored in chill rooms for storage.

The composition of the crude oil is approximately as follows:

15 percent unsaponifiable matter
71 percent mixed acids
14 percent gristle

Valeric acid constitutes 86 percent of the mixed acids
Oleic and palmitic 13 percent

Inasmuch as the demand for oils of this type is limited, fishing for blackfish is carried out on a small scale and incidental to other types of fishing.

During normal times, a market can be found for 300 to 400 gallons of oil per annum. Prices paid to the fishermen for blackfish oil range from 10 to 15 dollars per gallon.

Specifications for oil of this type generally require that the oil contain not more than 3/10 of 1 percent fatty acids and have a pourpoint of -20° F.

SALT OR SMOKED FISH: Tasty variations in the menu are provided by salt or smoked fish. Salt fish ordinarily requires one-half to several hours' soaking before further preparation; while smoked fish usually is ready to eat as it is or may be heated.

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SECTIONAL REVIEWS

Middle Atlantic

NEW JERSEY: Fresh fish landings at ports in New Jersey during March were about normal for this season, according to a report received from the Service's Fishery Marketing Specialist in that area.

In Pennsylvania, wholesale dealers in the vicinity of Philadelphia handled satisfactory amounts of good quality seafood, with the possible exception of fresh-shucked oysters from New Jersey waters. Since these oysters were somewhat smaller this year than in previous years, they were not as enthusiastically received by consumers.

Fish smoking firms in this area are gradually returning to normal operations, as they are receiving a larger quantity of good quality raw material. However, it is general speculation that prewar production will not be resumed for a year or two.

While labor disagreements are less disturbing than they were during 1945, they still represent a problem to fish processing plants throughout New Jersey.

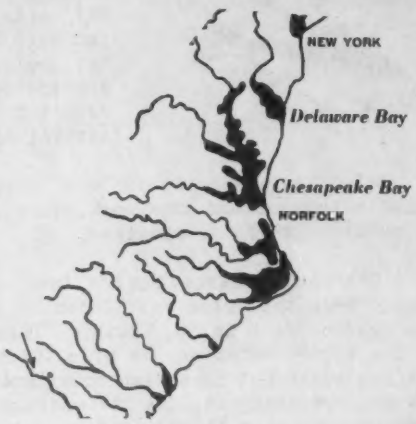
Chesapeake

VIRGINIA: The close of the Virginia crab-dredging season on March 31 found the prices for crabs low in comparison with those at the beginning of dredging operations, according to the Service's Fishery Marketing Specialists in that State. This decline in prices was caused by incoming trot-line and crab-pot catches. No scarcity of crabs has been reported, and it is anticipated that past records of production may be broken this season. The crab-dredge season in Virginia extends from December 1 to March 31. Complete catch reports are not available for December, but trade reports indicate that the catch was higher in December than in the other three months of the winter crab season. The trend was downward from December on. Although the total crab landings in March do not seem to have declined greatly, this was mainly due to catch by pots and lines during the latter part of March which offset a lessened dredge catch.

During March, the pound nets and fykes began to contribute a small amount to the receipts of fish. In another month, these will be the main gears in operation, as the New England vessels will be returning shortly to their home ports, followed within a few weeks by many of the Chesapeake Bay draggers. Large ocean trawlers began leaving Virginia waters the latter part of March, when pound-net fishermen

started to take large quantities of croakers as well as some shad and alewives. Prices declined considerably because of an over-supply from the two sources. Porgies reached a low of four cents a pound. However, within two weeks, the situation changed completely. The few trawlers still operating had to assume almost the entire burden of supply, as the pound-net catches had greatly declined.

The landings of fish during January and February were made almost entirely by fishing vessels using otter trawls. The local fleet of around 34 vessels was augmented by 40 vessels from New England. During January, 120 trips by draggers were reported for the Hampton Roads area. For February, the trips increased to 160 while March had the greatest number with 169. During March, besides the dragger landings, there were four trips of mackerel, totaling 94,000 pounds, by two Gloucester purse-seine vessels. Usually, the first mackerel landings of the season are made at Cape May, New Jersey.



According to some producers, during the first quarter of 1946 the production of seafood in Chesapeake Bay was affected by the industrial strikes of February and March. January was a month of heavy production as compared with February or March. During the quarter, higher grades of seafood continued to sell at something like a normal rate while lower grades refused to move. In oyster sales, "selects" and "counts" reportedly sold fairly well, while "standards" dropped to new lows in price but refused to move in any large quantities.

The berthing of Government ships in Virginia waters has begun and will increase. Oystermen have expressed some apprehension as to the effect on oyster production in these areas, because they feel that the already-existing polluted area would be extended; however, they are mindful of the fact that repairs to the ships would bring employment to local yards, and the community as a whole would profit. Even the oystermen would profit, if they cared to collect the oysters scraped off the hulls in drydock and sell or plant them. One ship is said to have yielded 500 bushels of seed.

In its biennial session, terminated in February, the Virginia General Assembly placed a daily maximum limit of 25 pounds on the taking of rock (striped bass) by sport fishermen. Also, it passed a bill of great importance to both sports and commercial fishermen: "To provide for the control, prevention, and abatement of pollution in the waters of the State." In brief, this bill sets up a State Water Control Board which is empowered to effect a gradual clean-up of State waters. There are a number of sources of pollution in Virginia. These include factories discharging waste, and towns, situated on waterways, without sewage purification facilities. To date, only a few of the offenders have taken voluntary measures to remedy conditions.

One of the largest districts under the jurisdiction of the Commission of Fisheries covers about 1,200 square miles, from Virginia's fall line to the beginning of salinity in the James and York Rivers. Two State-operated shad hatcheries, as

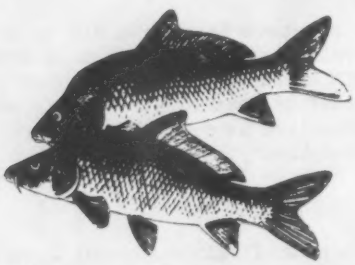
well as the Fish and Wildlife Service's Lake Harrison hatchery, are located in this district. Shad from the State hatcheries are released each spring in the Chickahominy, Pamunkey, and Mattaponi Rivers. Last year, approximately 2,000,000 fry were released. Fishermen in the area of the hatcheries' operations are very favorable toward them.

Principal gears in use in this district are, in order of abundance: Dip-nets, catfish pots, drift-gill nets, fyke nets, haul-seines, stake-gill nets, and carp-hedging. Dip-nets do not figure commercially, but their popularity among casual fishermen has increased noticeably in the last two years. It has been reported that one fisherman using this net captured several thousand alewives in a season.

Also increasing in use are drift-gill nets. These catch shad and some rock. Some with a smaller mesh are used for alewives.

The catfish market has declined somewhat since 1945, when the price was 50 cents per pound for the dressed fish in St. Louis. This decline may be due to a greater supply of catfish. Dressing catfish would not have been considered by Virginia fishermen a few years ago, but now all are doing it. The State has not yet protected catfish by law, consequently, some of them sent to market are rather small.

Carp are taken in largest numbers in Virginia waters with carp-hedging, which is a stop-net of one-inch mesh set up along shore at high tide. It is hung on light stakes which are put down and taken up with the net. It ranges from 500 to 1,000 feet in length and is about four feet high. Corn is often thrown in the water to attract the fish, and sometimes a haul-seine is used in conjunction with hedging.



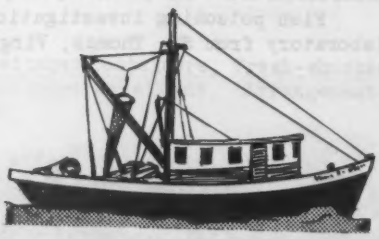
At least one operator buys carp alive and places them in his own ponds to cleanse their flesh.

Carp production in the James River area in 1945 is estimated at a million pounds.

South Atlantic

The period from March 15 through April 15 is usually the lowest productive season for fish and shellfish along the South Atlantic Coast, according to the Service's Fishery Marketing Specialist making the commercial fishery survey in that area.

If the shrimp fleet depended wholly upon shrimping during this season of the year, it would be tied up at the docks. Vessels which averaged two or three thousand pounds per week during the height of the shrimp season, were bringing in only a few hundred pounds. Fish production is low in proportion, so the fishermen and dealers have turned to crabbing, which, until the past few years, was shunned by the shrimping fleet. As soon as the shrimp production increases, crabbing operations will again be abandoned by the fleet. Dealers who previously refused to allow their fleet to indulge in crab fishing have been taking all the vessels bring in. Crab trawling is hard on shrimp nets, but eventually shrimpers will learn how to be good crabbers. With the shrimping fleet turning temporarily to crab production, the 1945-46 survey will, undoubtedly, show an increase in crab production over previous years.



The catfish has recently become of interest to the fishery trade in Georgia. So popular has this species become that some orders have been shipped by air express, and a few dealers are enthusiastic about finding greater sources of supply.

While shad production in Georgia was high this season due to the return of many fishermen from the military service, maximum production was not attained because of the difficulty in getting shad nets and the unusually wet season that kept the rivers too fresh. Roe shad averaged $3\frac{1}{4}$ pounds in size in St. Mary's River and $4\frac{1}{2}$ pounds in the Altamaha and Ogeechee Rivers. Prices to fishermen were one dollar per roe shad at the beginning of the season and 70 cents at its close. This appears to be one item that has not been accorded the price increase of other seafoods of recent years.

TECHNOLOGICAL RESEARCH IN SERVICE LABORATORIES

Mayaguez, Puerto Rico

The general survey of the fisheries of Puerto Rico is nearing completion and the data are being edited and tabulated for analysis and interpretation.

Fish poisoning investigations have been continued with fish shipped to the laboratory from St. Thomas, Virgin Islands. No toxic effects have been noted in mice. Fresh and fried fish which were suspected of causing poisoning in four persons also were tested in mice, with negative results. When ingested by a human volunteer, a mild gastro-intestinal disturbance was observed.

Studies of coco fiber cordage have been terminated because of its unsuitability for fishing operations. It was found to rot and lose its strength within five weeks of normal wear.

Additional facilities for housing animals used in experimental work have been installed at the laboratory.

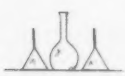
Instructions in the preparation of seafood was given to a seafood restaurant in Santurce.

Boston, Mass.

Equipment was installed at the field laboratory at Eastport, Maine, to facilitate the study of Maine sardines. A mechanical fish scaling and grading device of the type used in the California pilchard canneries was studied for possible application in the Maine canneries.

The efficiency of certain commercial anti-oxidants as a preservative for sardines prior to packing was tested, but no preserving effect was observed.

The equipment for the Boston laboratory is arriving and is being installed as rapidly as possible.



College Park, Md.

The 12-month storage test with packaged, frozen shucked oysters has been completed. In general, the packages were satisfactory. The stored specimens retained their flavor and received better scores in the palatability tests than the fresh controls.

A new series of tests with packaged oysters was started, using packages made of metal foil laminated to paper, cellulose acetate, vinyl films, and other materials. Storage time will be 12 months at 0° F.

To test several specially constructed insulated paper containers, fresh-shucked oysters were shipped by air to Chicago. Results were excellent. Arrangements also have been made to ship live lobsters by air.

Experiments are under way to determine the effect of several types of pretreatment on the freezing and keeping quality of shucked oysters.

Data have been obtained on various phases of fish curing, including designs of smoke houses and artificial driers; types of cure for ground fish, finnan haddie, kippers, and dulse; preparation for smoking of skinless and boneless salt cod, codfish bricks and shredded cod, etc.

A survey of the vitamin literature is being made to be included in a report dealing with the experimental findings obtained during the past year.

Preliminary experiments are being conducted on samples of canned fish to determine the level of vitamin B.

A series of feeding tests have been made using white rats fed salmon "cannery loaf," using canned salmon as a control. The control animals made small gains in weight; whereas, those fed two types of "loaf" lost weight.

Experiments are in progress to prepare a blown menhaden oil which will be satisfactory for use in the paint and varnish industry. Samples of cold-pressed menhaden oil were blown with air and oxygen at various temperatures and with various additions to obtain adequate viscosity. The rate of development of color in these oils seems to be affected by the temperature at which the oil is blown.

A synthetic oil was prepared by re-esterifying unsaturated menhaden acids with pentaery-thritol. When one part of this was mixed with three parts of cold-pressed oil, the mixture blown with air at 95° C., the color appears to be satisfactory.

A sample of menhaden oil containing cobalt oleate and blown at 58° C., promises to have a light final color. The organic peroxides formed during the oxidation appear to be very effective in bringing about an increase in viscosity.

Studies of the toxicity for chickens of DDT-treated crab meal are being continued. There is no apparent influence on egg production, but some chicks fed 0.032 percent DDT over a period of six weeks have shown slight tremors. Growth rate, apparently, is not affected.

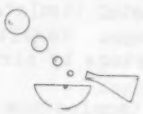
Palatability tests have been made on fresh and frozen oysters, seal liver paste, and dehydrated clams.

An exhibit of bacteriological methods and sanitation technics was set up at Crisfield, Md. Watermen, producers, and other residents of the community, including high school students, visited the exhibit.

A search for antibiotics of marine and fresh-water origin is being initiated.

A study is being made of the effect of sodium nitrate, lactic acid, citric acid, and other bactericides upon bacterial spoilage of oysters. Spoilage is being determined by bacteriological and organoleptic tests.

Ecological studies of the enterococci are being continued. Recent experiments indicate that these forms may be found in abundance in certain frozen foods.



Ketchikan, Alaska

Recipes for Alaskan fish have been developed and tested by various methods of cooking.

Experiments are being conducted to develop a rapid procedure for the determination of riboflavin in fishery products.

Information has been gathered on a variety of Alaskan species of fish and is being made a part of the permanent file at the laboratory.

Seattle, Wash.

With the exception of a few references not available in Seattle, a bibliography on fish spoilage has been completed.

Recipes for use on the labels of fishery products have been developed, including fish recipes that were worked out for the Seattle Times, which featured them in an article on Lenten suggestions.

A comprehensive table of the vitamin A and D content of fish liver oils has been prepared, and a manuscript begun on the fish liver oil industry.

Preliminary experiments were run on the stability of vitamin A oils.

A demonstration of methods of preparing fish for home freezing was given to home economists from public utility companies and newspapers.

A general chemical laboratory is being equipped to facilitate a new project for fellowship students.

Assistance was given to the Pacific Exploration Company in regard to the alteration of the factory ship, Pacific Explorer. Efforts were directed to effecting economies in the work and in locating fish and crab handling conveyors. Problems concerning the installations of electrical mechanical driving equipment, and an improved steering system in the trawlers were considered.

On the evenings of March 4 and 5 the annual open house was held. The demonstrations and displays explained several important phases of the work of the laboratory. The attendance for the two evenings totalled 390. This included persons from fish canneries, fresh and frozen fish plants, fishery supply houses, colleges, naval architects' offices, reduction plants, publication concerns, fishery associations and fisheries, vitamin A processors, and government agencies.

FOOD WRAPPINGS

Improved mechanical heat-sealers are needed to make waxed paper wrappings for frozen food and other food products fully satisfactory and protect the quality of the food inside, according to scientists of the Western Regional Research Laboratory of the Department of Agriculture at Albany, California (from Food and Home Notes, April 10). The scientists believe the present need is for sealers that have carefully controlled temperature and pressure.

All of the various waxed papers in use for bags, bag linings for packages and overwraps are sealed by hot pressing. The heat of the sealer melts the wax coating and the pressure holds the paper surfaces together until the wax cools in an "adherent bond" and becomes solid again. This requires carefully controlled heat. Too high or too low a temperature results in an imperfect seal.

Very often, waxed paper wrappings on foods have proved unsatisfactory because the water-vapor resistance of the paper was broken down in the sealing process, and the food inside has lost quality as a result.

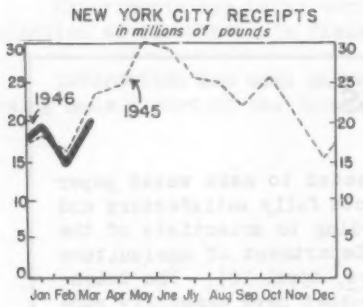
FRESH AND FROZEN FISH

New England

NEW ENGLAND LANDINGS: Landings by fishing craft during January at Boston, Gloucester, New Bedford, Portland, and ports on Cape Cod, totaled 14,643,000 pounds, a decrease of 21 percent under January 1945, according to the Service's Current Fishery Statistics No. 254.

Gloucester, with 4,770,000 pounds, received the largest percentage of the total landings of January. New Bedford was second with 4,523,000 pounds, and Boston was third. Landings at Boston amounted to 9,514,000 pounds during January 1945, exceeding those of other New England ports, but fell to 3,430,000 pounds in January 1946. The decrease resulted from a tie-up of nearly all of the large trawlers because of a dispute between fishermen and vessel owners.

Middle Atlantic

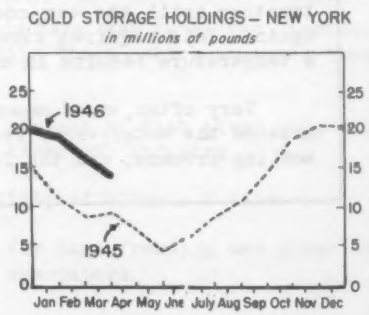


NEW YORK CITY RECEIPTS: Landings and receipts of fresh and frozen fishery products in New York City during March totaled 20,000,000 pounds, according to the Service's Market News Office in that city. Approximately 17,600,000 pounds arrived by truck, express, and freight, while landings totaled about 2,400,000 pounds. The leading fresh varieties were cod, haddock, flounder, fluke, and porgy.

Inclement weather conditions were responsible for light production during the first of March. This allowed the total catch to fall below that for the corresponding period in 1945.

NEW YORK CITY COLD-STORAGE HOLDINGS: Stocks of fish and shellfish in New York's cold-storage warehouses on April 1 totaled 13,783,000 pounds, according to the Service's Market News Office in that city. This showed a decrease of 2,900,000 pounds compared with 16,706,000 pounds held on March 1, but exceeded holdings on April 1, 1945, by 4,875,000 pounds.

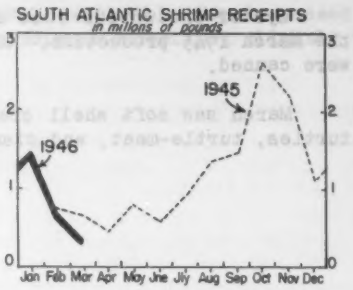
Inventories of fresh-water species increased slightly, but salt-water species and shellfish totals declined. Mackerel, salmon, and whiting accounted for the major portion of the withdrawals. Shrimp stocks declined about 700,000 pounds, while lobster tails were the only species of shellfish showing an increase.

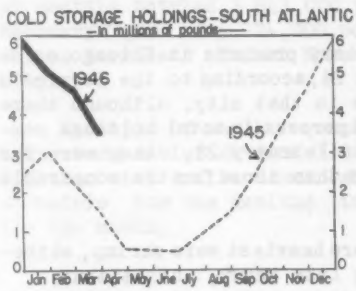


South Atlantic

SHRIMP PRODUCTION: Shrimp production for Florida and the South Atlantic States amounted to 279,000 pounds during March, 58 percent below February landings and 56 percent less than production during March 1945, according to the Service's Market News Office at Jacksonville.

In addition to bad weather, Florida's first closed season on shrimping, effective from March 15 to April 15, and the presence of considerable quantities of small shrimp of unmarketable size in the landings, were largely responsible for the decline in production.





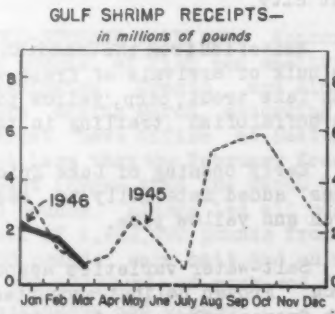
COLD-STORAGE HOLDINGS: Holdings of fishery products in five major cold-storage warehouses in the South Atlantic States amounted to 3,529,000 pounds on April 1, according to the Service's Market News Office at Jacksonville. While these stocks were 22 percent less than holdings on March 1, they were more than double the holdings on April 1, 1945.

Fish and shellfish stocks decreased 600,000 pounds and 400,000 pounds, respectively. Heavy withdrawals of fish, shrimp, and fillets during the month were responsible for the major portion of the reduction.

Gulf

PRODUCTION: Shrimp production in the Gulf area during March amounted to only 6,000 barrels as compared with 12,000 barrels in February, according to the Service's Market News Office at New Orleans. Production for the first quarter of 1946 compared favorably with the 5-year average for the similar period, however.

Landings of salt-water fish during March were the largest recorded for this year. The red snapper catch of 268,000 pounds accounted for more than half of the total production.



Of the fresh-water species taken, catfish predominated, with 110,000 pounds landed.

Oyster production rose nearly 50 percent over February, but lagged behind the March 1945 production. Of the 88,000 barrels landed in March, 63,000 barrels were canned.

March saw soft shell crabs enter the markets, as well as larger amounts of turtles, turtle-meat, and diamond-back terrapin.

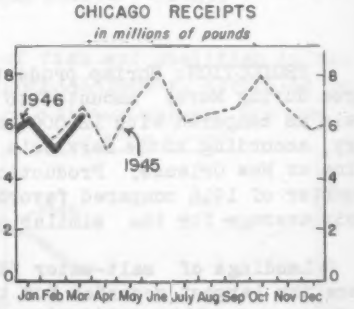
Great Lakes

CHICAGO COLD-STORAGE HOLDINGS: Holdings of fishery products in Chicago cold-storage warehouses totaled 6,798,000 pounds on March 28, according to the Service's Market News Office in that city. Although there was a decline of 8 percent in total holdings compared with those of February 28, they were far greater on March 28 than those for the comparable date in 1945.

Stocks that were heaviest were shrimp, whitefish, cod fillets, lake trout, and halibut.

Large stocks of frozen fish were thrown on the market for quick handling as a result of a fire early in March which damaged two private cold-storage plants. Consequently, the glutted market affected public cold-storage withdrawals.

CHICAGO RECEIPTS: Receipts of fish and shellfish during March in the Chicago wholesale fish market totaled 6,290,000 pounds, 23 percent larger than those of February and 7 percent less than March 1945, according to the Service's Market News Office in that city.



Whitefish from the Canadian Provinces formed the bulk of arrivals of fresh-water varieties, with lake trout, carp, yellow pike, sheepshead, and buffalofish trailing in the order listed.

Early opening of Lake Erie fishing operations added materially to receipts of yellow perch and yellow pike.

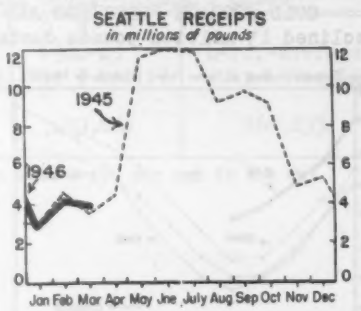
Salt-water varieties accounted for 27 percent of the total arrivals during March. Frozen halibut accounted for 32 percent of the total salt-water varieties, with frozen salmon, cod, haddock, and frozen sablefish following in order of importance.

Shellfish receipts were 23 percent less than those of February and 31 percent larger than March 1945.

Large shipments of frozen fishery products were responsible for increased freight movements into Chicago during March. Express shipments declined slightly, but truck shipments increased considerably.

Pacific

SEATTLE RECEIPTS: Landings and receipts of fresh and frozen fishery products at Seattle totaled 3,843,000 pounds during March, a drop of 9 percent below the February figure of 4,224,000 pounds, according to the Service's Market News Office in that city.

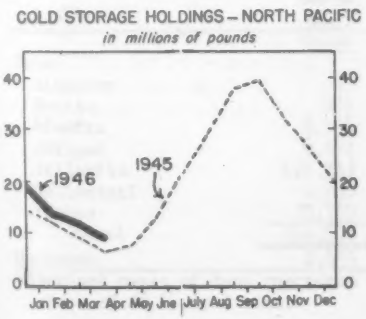


Receipts of smaller quantities of frozen halibut and sablefish from Alaska during March, together with smaller local landings, were responsible for the decline in total receipts for the month.

Receipts of fresh and frozen fish and shellfish from local sources totaled 2,231,000 pounds.

Landings by the local otter-trawl fleet totaled 1,511,000 pounds, or about 40 percent of the total receipts. Nearly a million pounds of rockfish were received by Seattle dealers during March, which tended to glut the market, despite concerted efforts of the industry to dispose of the fish through regular channels of distribution.

The cumulative 1946 total to March 31 was 11,006,000 pounds, 3 percent less than the cumulative total to March 31, 1945.



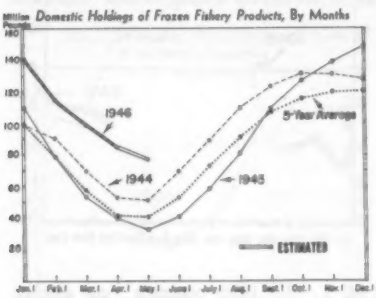
NORTHWEST COLD-STORAGE HOLDINGS: Approximately 2½ million pounds of fish and shellfish were frozen in Washington, Oregon, and Alaska cold-storage plants during March, according to the Service's Market News Office at Seattle. This was 18 percent less than the February freezings, but 158 percent larger than the March 1945 figure of 999,000 pounds. Alaska led all other areas, with a total of 1,662,000 pounds frozen, of which 1,623,000 pounds were bait and animal food. There were 308,000 pounds of rock cod fillets frozen in Washington and Oregon.

Holdings of fish and shellfish on April 1 for all areas totaled 9,332,000 pounds. This represented a decrease of 21 percent compared with holdings on March 1, but showed an increase of 48 percent over the April 1, 1945 figure. The largest decline was noted in holdings of fish, while shellfish inventories declined only 6 percent from the previous month.

Heaviest inventories of cured fish, 592,000 and 188,000 pounds respectively, were shown for mild-cured salmon and salted herring.

United States

COLD-STORAGE FREEZINGS AND HOLDINGS: Holdings of frozen fish and shellfish declined 15 million pounds during March and on April 1 totaled 84,265,000 pounds. This was 112 percent above holdings on April 1, 1945, and 103 percent above the 5-year average for this date, according to the Service's Current Fishery Statistics No. 261.



Freezings of fishery products in domestic cold-storage plants totaled 11,077,000 pounds during March. This brought the total freezings during the first three months of 1946 to 23,535,000 pounds as compared with 16,000,000 pounds during the same period of 1945, an increase of 47 percent.

CANNED AND CURED FISH

Shrimp

SHRIMP PACK: The canned shrimp production fell to 30 standard cases between February 25 and March 16, according to reports to the U. S. Food and Drug Administration from plants covered by its Seafood Inspection Service.

During the period July 1, 1945 through March 16, 1946, a total of 28 plants canned 124,265 standard cases of shrimp, compared with 39 plants and 409,058 standard cases for the corresponding period in the 1944-45 season.

The marked decline in canned production during March was largely in keeping with the normal seasonal trend.

Wet and Dry Pack Shrimp in all Sizes in Tin and Glass--Standard Cases*

MONTH			SEASON		
1946 Feb.25-Mar.16	1945-46 Feb.3-23	1945 Feb.25-Mar.17	1945-46 July 1-Mar.16	1944-45 July 1-Mar.17	4-yr.-average July 1-Mar.18
30	2,108	1,342	124,265	409,058	368,233

* All figures on basis of new standard case--48 No. 1 cans with 7 oz. per can in the wet pack and 6½ oz. per can in the dry pack.

Tuna

TUNA AND MACKEREL PACK: The pack of tuna by California canners during March amounted to 164,978 standard cases, an increase of 5 percent over the February

California Pack of Tuna and Mackerel--Standard Cases*

Item	March 1946	February 1946	March 1945	Three mos. ending with March-- 1946	1945
	Cases	Cases	Cases	Cases	Cases
Tuna:					
Albacore	25	-	-	25	1,448
Bonito	852	1,676	29	3,853	1,519
Bluefin	8,356	18,422	14,904	35,707	20,358
Striped	8,274	11,321	4,475	28,475	24,286
Yellowfin	121,342	84,793	58,790	335,885	173,383
Yellowtail	2,960	15,800	69	19,274	651
Flakes	23,169	24,593	35,756	68,521	66,429
Total	164,978	156,605	114,023	491,740	288,074
Mackerel	2,555	13,226	70	50,830	58,908

*Standard cases of tuna represent cases of 48 7-ounce cans, while those of mackerel represent cases of 48 1-pound cans.

pack and 45 percent over that of March 1945, according to information released by the California Division of Fish and Game. Yellowfin tuna accounted for 74 percent of the March production. The total pack for the first three months of the current year was 491,740 standard cases, 71 percent above that of the corresponding period in 1945.

The March mackerel pack totaled 2,555 standard cases, as compared with 13,226 standard cases in February and 70 standard cases in March 1945. The three-month total, 50,830 standard cases, was 14 percent below that of the previous year.

SWORDFISH

The swordfish ranks high among the "quality fish" of New England. Thick steaks entirely free from small bones are cut from this large fish. They are excellent when broiled, and planked swordfish is a special delicacy. The flesh is somewhat like that of halibut in consistency, but is more oily and has a rich, indescribable flavor that is different from that of any other product of the sea.

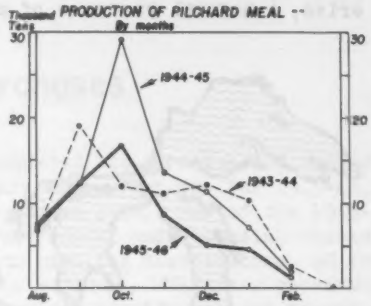
The vitamin content of swordfish-liver oil is exceptionally high. This oil has been found by chemists of the Fish and Wildlife Service to be "100 times more potent in vitamin A than the U.S.P. reference sample of cod-liver oil of 3,000 U.S.P. units per gram, and 500 times more potent than the minimum U.S.P. requirement for cod-liver oil." It is interesting to compare this product and certain foods that we ordinarily regard as good sources of vitamins A and D. For example, the vitamin A content of swordfish-liver oil is 25,000 times as high as that of butter or eggs.

Conservation Bulletin No. 33

FISHERY BYPRODUCTS

Oil and Meal

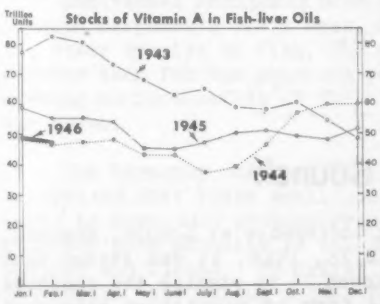
The production of pilchard meal during the 1945-46 season totaled 56,525 tons, a decline of 33 percent compared with the 1944-45 season. Output from October to the end of the season was considerably lower than that for the year previous. Pilchard oil production totaled 11,230,607 gallons during 1945-46 as compared with 17,702,612 gallons during the previous season.



Total production of fish oils during February amounted to 84,839 gallons, bringing the output for the first two months of 1946 to 517,833 gallons, 54 percent less than the corresponding period of 1945, according to the Service's Current Fishery Statistics No. 258. Although complete data were not available on meal and scrap production, items which account for approximately 94 percent of the total yield showed a production of 2,400 tons during February and 9,328 tons during the first two months of 1946, a decline of 31 percent below the same months in 1945.

Vitamin A

Stocks of vitamin A in fish-liver oils on January 31 were reported at 47 trillion units, a decline of 3 percent under stocks held on the first of the month, and 14 percent less than those of January 31, 1945, according to the Service's Current Fishery Statistics No. 266.



Production of vitamin A during January totaled 4.8 trillion units compared with 4.6 trillion units produced during January 1945.

Receipts of livers during January totaled 1,310,000 pounds, containing about 4.8 trillion units of vitamin A. During January 1945, 759,000 pounds of livers having a vitamin A content of 4.5 trillion units were received.

OTHER FISHERY NOTES

Great Lakes Treaty

The United States and Canada signed, on April 2, at Washington, a treaty to provide for the development, protection, and conservation of the Great Lakes fisheries, a natural resource of mutual interest to the two countries. The treaty was signed on behalf of the United States by the Acting Secretary of State, the Honorable Dean Acheson, and on behalf of Canada by the Honorable Lester B. Pearson, Canadian Ambassador at Washington, and by the Honorable Francis Bridges, Minister of Fisheries.

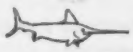
In 1940, the United States and Canada established the International Board of Inquiry for the Great Lakes Fisheries to study the taking of fish in the Great Lakes and to make recommendations as to methods for preserving and developing these fisheries. The Board of Inquiry made extensive investigations, which included 29 public hearings, and in August 1942, submitted its report and recommendations to the Governments of the United States and Canada. It was apparent from the Board's report and from discussions and continuing study of the matter on the part of Federal, State, and Provincial officials that measures with respect to the fisheries of the Great Lakes could be made effective only through coordinated action of the governments concerned. Therefore, it was recommended that the United States and Canada enter into a treaty to provide for cooperation and joint action in conserving and developing the Great Lakes fisheries. In view of the successful conservation of fishery resources which has been achieved under treaties between the United States and Canada, it is believed that cooperation of the two countries with respect to the Great Lakes fisheries should have similarly successful results.

International Fishery Council

In a press release issued by the Overfishing Conference at London, England, and transmitted to the State Department on March 26, 1946, it was stated that "an international conference opened in London on March 25 to examine the question of overfishing and, if possible, to draw up some form of regulatory agreement among the nations concerned. Such an agreement is essential if the overfishing after the 1914-18 war, when the stocks of fish accumulated during the war years in the North Sea were rapidly depleted, is not to be repeated. The following countries were represented at the Conference:

Norway	Poland	Holland	France	Spain	Iceland
Sweden	Denmark	Belgium	Portugal	Eire	Great Britain

The International Council for the Exploration of the Sea, which has for many years given attention to this problem, was also represented."



USDA Canned Fish Purchases

By March 1, the Department of Agriculture had completed its purchases of canned fish to fill all Government commitments for military and export use for 1945-46, according to The National Food Situation for February-March 1946. Out of the 1945-46 pack of 617 million pounds, imports of 30 million pounds, and beginning stocks of 60 million, over 400 million pounds have gone into civilian distribution, 60 to our armed forces and about 175 for export. Of the exports, UNRRA has received 60 million pounds, the United Kingdom and British Services about 80 million pounds, and others, 35 million pounds.

Farm Ponds

Farm ponds in the United States received almost 5½ million young fish from hatcheries operated by the Fish and Wildlife Service during the past year, Secretary of the Interior J. A. Krug announced on April 11.

Individual farm ponds totaling 9,529 were planted with largemouth black bass, bluegill sunfish, and ten other species of fish. The demand was 75 percent greater than for the previous year, and appears to be growing as the benefits of the farm pond become better known.

The Director of the Fish and Wildlife Service pointed out that these small ponds, mostly one to five acres in area, will produce from 200 to 300 pounds of fish per acre annually in the South if properly fertilized and fished. To assist in management of this enterprise, the United States Fish and Wildlife Service, Merchandise Mart Building, Chicago 54, Illinois, has available, for free distribution, the following publications:

Fishery Leaflet No. 17 - The Construction of Farm Ponds
Fishery Leaflet No. 27 - Farm Fish Ponds and their Management
Fishery Leaflet No. 65 - An Outlet Gate for Farm Fish Ponds

Air Transport

A 44-page report on the transport of agricultural perishables by air has been published by the United States Department of Agriculture. This pamphlet, prepared in anticipation of postwar changes in marketing practices, is Miscellaneous Publication No. 585. It is available from the U. S. Department of Agriculture, Washington 25, D. C., free of charge.

Oyster Hearing

A hearing on regulations on raw shucked oysters was held by the House of Representatives' Committee on the Merchant Marine and Fisheries on July 16 and August 14, 1945; and January 15, 16, and 17, 1946. Part 2 of the report on the hearings has recently been issued. If copies of these reports are desired, they may be obtained by addressing a request to the Committee on the Merchant Marine and Fisheries, U. S. House of Representatives, Washington 25, D. C.

Purchases of Fish by Department of Agriculture

February purchases of fishery products by the U. S. Department of Agriculture showed a decline of $2,928,967 as compared with January. Total purchases from January 1 to February 28, 1946, were $3,547,739.

Purchases of Fishery Products by USDA

Commodity		Unit	February 1946		January-February 1946	
			Quantity	F.O.B. Cost	Quantity	F.O.B. Cost
FISH AND SHELLFISH				Dollars		Dollars
Herring,	canned	Cases	-	-	-	-
Mackerel,	"	"	450	2,194	4,662	22,728
Pilchards,	"	"	63,650	234,488	140,220	517,055
Salmon,	"	"	8,093	60,106	269,658	2,961,429
Sardines,	"	"	2,754	12,598	9,929	46,527
Grand Total	"	"	74,947	309,386	424,469	3,547,739

FOREIGN FISHERY TRADE

Imports and Exports

GROUNDFISH IMPORTS: From January 1 through March 30, 1946, there were 12,416,533 pounds of fresh and frozen groundfish imported into the United States, an increase of 4,566,980 pounds compared with the same period in 1945, according to a report received from the Bureau of Customs of the Treasury Department. The reduced tariff quota for the year is 15,000,000 pounds or 15 percent of the average apparent consumption of the past three years, whichever is greater.

Commodity	Mar. 4-30, 1946	Feb. 4-Mar. 2, 1946	March 1945	Jan. 1-Mar. 30, 1946	Jan. 1-Mar. 30, 1945
Fish, fresh or frozen fillets, steaks, etc., of cod, haddock, hake, cusk, pollock, and rosefish	5,294,741	3,497,692	3,940,872	12,416,533	7,849,553

Australia

WHALE FISHERY: After a lapse of decades, Australian whalemen will once again enter the Antarctic whale fishery and take a share of the wealth offered by those waters, according to the February 1946 issue of the Fisheries Newsletter.

Humpback Whale

On January 18, a full Cabinet of the Commonwealth Government agreed to ratify the International Whaling Agreement and Protocol as a preliminary step towards the establishment of a whaling industry based in this country. The Cabinet also decided to place an order in Great Britain for the construction of a modern factory ship of 20,000 tons.

It is anticipated that the keel of the new vessel will be laid in May and will be completed, together with chaser vessels, in sufficient time to engage in operations for the season 1947-48.

In a statement issued following the Cabinet meeting, the Prime Minister said that the establishment of shore-whaling operations in Western Australia and Tasmania would be discussed with the Governments of those States.

Before the war, the main countries concerned with whaling were Britain, Norway, Germany, Japan, and the U.S.A. Most of the whaling was concentrated in the Antarctic, and of the total catch in this area, the Japanese took 11 percent. The British and Norwegian companies were generally financed by British capital, and the British companies were operated by Norwegian experts.

Up to the present time, Australia has taken very little part in the whaling industry. In the early days, considerable activity took place in Australian waters, but during the 20th century very little has been done. A small primitive station has operated intermittently at Twofold Bay, and a shore station was established at Point Cloates, in Western Australia, by the Norwegians. This station, however, has not been sustained. Factory ships have operated in Australian territorial waters with considerable success, but these have been American or British owned.

Whales occur in Australian territorial waters, and Australia controls practically one-third of the Antarctic waters, which are the richest whaling grounds in the world. It, therefore, seems obvious that this country should take part in this valuable industry.

The development of an Australian Whaling Industry would yield the following benefits to the country:

1. Certain industrial products would become available directly, such as whale oil, meat meal, fertilizer, pharmaceutical preparations, and baleen, or whalebone.

2. Avenues of employment for Australian capital and labor (particularly discharged service personnel) would be provided.

3. Facilities would be provided for training seamen for naval establishments and the Australian maritime fleet.

4. Australia's hold upon waters under control would be strengthened.

Canada

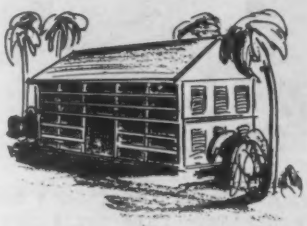
COLD-STORAGE: A small increase during March in Canadian holdings of fresh frozen fishery products, due mainly to enlarged stocks of cod fillets and tullibee, was indicated in a preliminary report of the Department of Trade and Commerce of the Dominion Bureau of Statistics. Holdings totaled 17,123,000 pounds on April 1 compared with 16,762,000 pounds on March 1 and 15,428,000 pounds on April 1, 1945.

HALIBUT VESSELS: Canadian fishing vessels engaged in the North Pacific halibut fishery are entitled to land their catch of halibut in ports of entry in Alaska

until and including June 30, 1946. An order to this effect, which waived compliance with Section 4311 of the Revised Statutes in these cases, was issued on April 24 by the U. S. Treasury Department. Landings are subject to compliance with applicable customs laws.

Costa Rica

A report received by the State Department from the U. S. Embassy at San Jose, Costa Rica, discussing the economic developments in that country's fisheries during 1944 and 1945, is extracted as follows:



Fishing for tuna takes place off the Pacific Coast in the waters off Puntarenas. Most of the boats are from California and, with few exceptions, use live bait and hooks instead of purse seines. A company of the United States maintains a canning factory and refrigeration plant at Puntarenas, serviced steadily by several boats working out of that port intermittently and by some of the California fleet.

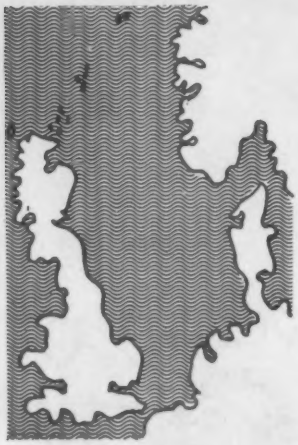
Exports of frozen tuna in 1945 weighed 651 metric tons, valued at (U.S.) $112,759. Canned tuna shipped in the same period amounted to (U.S.) $185,167 in value. Shipments during 1944 followed a different pattern. Frozen tuna weighing 864 metric tons was exported during the year but at a total value of (U.S.) $413,182. The canned product, on the other hand, had a value of (U.S.) $9,587 for a weight of 10.4 tons.

The shark liver business declined in 1945. Fishing boats had to go farther and farther from shore to make paying catches, either because the fish were being killed off too rapidly or because they shunned waters where others had been cut open and thrown overboard. Interest also ceased in Caribbean Coast sharks, because their livers were found to contain too low a vitamin content. Exports for the year were valued at (U.S.) $43,387 (60 metric tons) in comparison with (U.S.) $50,023 (92.8 tons) in 1944. At the present time, the skin, fins, and meat are being wasted; the carcass is not even converted into fish meal.

Turtles lay their eggs along the sandy beaches between Limon and the Colorado Bar on the Caribbean side. Here they are caught by the hundreds and shipped alive to the United States. This business was worth (U.S.) $7,979 in 1945 (148 metric tons) as compared with (U.S.) $1,561 (23.8 tons) in 1944. It was reported that there is danger of extermination of the turtles along the shore for lack of conservation measures.

England

Although three members of the staff of the Fisheries Laboratory, Lowestoft, who were acting as coastal fishery officers, succeeded in making scientific observations which have given valuable information on the wartime recovery of fish stocks, all co-ordinated scientific work at the Laboratory was suspended during the war, according to Nature (London), April 13, 1946. The Laboratory reopened in September 1945, when ichthyometric work on the chief food fishes and age-composition observations on the North Sea plaice and herring were resumed at the appropriate ports of landing. Plans for work in the waters around the British Isles and in the Arctic fishing grounds are in active preparation. These include the construction of a new laboratory, the building of a large research ship of the type used by the Hull trawler owners for the prolific Arctic fishery, and the conversion for research work in the North Sea of the Admiralty trawler Sir Lancelot, built during the war on the model of a successful commercial type--the Star of Orkney. In the meantime, a 90-foot motor fishing vessel of a class built by the Admiralty with a view to subsequent use as fishing boats has been borrowed and converted to carry a trawl on the starboard side. This vessel is to be known as the Platessa. While her main task will be to mark large numbers of plaice in the southern North Sea so as to obtain vital information on the yield of the stock at the present rate of fishing, it also is hoped to gain information on the suitability and efficiency of this type of craft as a commercial trawler.



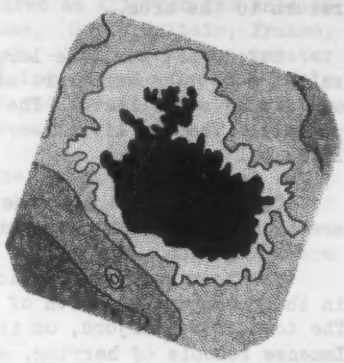
RECORD TRAWLER CATCH: A new record catch for trawlers operating out of British ports was reported in the March 23rd issue of the Fish Trades Gazette (London) after a 23-day trip to fishing grounds off Norway, the Norman Sky landed 662,340 pounds of fish at Grimsby.

Iceland

Perhaps in no other country on earth do the fisheries play as decisive a role as in Iceland, which is almost devoid of mineral resources and vegetable raw materials for industry, according to a report released by the State Department from the U. S. Legation at Reykjavik, Iceland.

Excerpts from the report follow:

With an abundance of easily caught fish in adjacent waters, Iceland has developed into practically a one-product country and today is dependent almost entirely upon active foreign markets for its fish and fishery products for earning its livelihood and maintaining its standard of living.



The Icelandic fisheries are reputed to be as old as the nation itself. It is said that the early Viking settlers brought the technique with them from old Scandinavia. However, until 1300, fishing was no more than spare time activity.

Early fishing was done with a hand line. Around 1400, the long line was introduced. Between 1400 and 1800, the activity continued on a limited scale, and only open row boats with hand lines and long lines were used. Fishermen rarely ventured out into the open sea. They fished in the fjords and the nearest of the offshore banks. Early in the nineteenth century, decked sailing vessels began to replace the open boats. Hand and long lines continued to serve as tackle, but more distant and more productive grounds could be reached by these vessels. Around 1900, the steam trawler was introduced, followed by the motor boat. Likewise, there began the use of nets. During the past 45 years, there has been a steady trend towards increasing the number of mechanically propelled boats and towards improving the quality of the equipment used.

The Icelandic fishing fleet consists of nearly 1,000 units, ranging in size from 3 tons upward. Of these, 624 are motor driven.

About 7,000 of the 126,000 population are employed in the fishing fleet. With their families, 16 percent of the population, or 20,000 persons, are directly supported by the fisheries.

Today Iceland is one of Europe's greatest fishing nations and, on the basis of volume per inhabitant, far in the lead.

The ocean around Iceland is reputed to be one of the richest fishing areas in the world. The banks to the south and southwest of the country are especially rich in cod. In January and February each year, the schools of cod migrate from the ocean to spawning places near the coast. The major cod fishing activities take place in these waters in the late winter and early spring months. However, fishing is carried on off the coast practically the whole year around.

Before World War II, Iceland had at least 11 different foreign nations competing with its fishing fleet on the extensive banks which surround the country. Despite a great drain on the fish resources, it does not appear to have decreased them in any great degree, and in spite of the competition in the prewar days, the Icelanders caught almost one-half of all the fish that were taken near Iceland and far more than any of their foreign competitors. The war halted the fishing operations in the neighboring waters of Iceland of nearly all other European coun-

tries, leaving the banks to be worked almost exclusively by the Icelanders. Since the end of the war, British, Norwegian, and Swedish fishing vessels have begun to return to the area.

Before the war, the large cod catches were used chiefly in manufacturing dry salted cod. The war years saw a shift towards production of fresh cod on ice, and frozen cod fillets. The dry salted cod output dwindled and almost ceased completely. The cod livers were, and continued to be, the basis of a thriving cod-liver oil industry.

In addition to cod, other important varieties of fish caught in Icelandic waters are haddock, pollock, halibut, flounders, and herring.

The herring fishery in Iceland is distinctly seasonal. It is maintained mainly in the ocean waters north of the country from about July 1 until September 15. The town of Siglufjord, on the north coast, is the central point of the industry. Immense schools of herring, searching for food, migrate towards the land and feed on the ocean's supply of plankton. The catch is taken mainly with purse-seine nets and partly in gill nets. Some boats take as much as 135 to 200 metric tons (298,000 to 441,000 pounds) of herring in one haul. A portion of the catch is salted in barrels and cured in various ways. Much of the herring, however, is not salted or cured and is utilized in the numerous herring oil factories which, in recent years, have been built in northern Iceland. In these plants, the oil is pressed out of the herring, while the residue is made into herring meal for sale as stock food on domestic and foreign markets. A small, but expanding, canning industry absorbs some of the herring for making certain canned specialty items such as gaffelbitter and fat herring fillets in oil.

Salted Herring

Iceland's catch per capita in 1935 was more than six times as great as that of Norway, which ranked first in total quantity. During the war years, the production of Iceland's fisheries increased steadily. In 1944, the catch amounted to 461,314 metric tons, or 8,069 pounds per capita.

It is estimated that, in the years just prior to the war, Icelandic waters produced from 17 to 21 percent of the total output of Europe, Icelanders catching about half of this amount, the rest having been taken by fishermen from other countries.

The extreme perishability of fish and the fact that Iceland's fishing grounds are located far from consuming centers have always necessitated the utilization of preservation methods such as drying, salting, icing, or freezing.

Experiments in fish fillet freezing were started in 1929 and proved successful. Soon, plans for a gradual expansion of the original plant and the construction of new ones were undertaken. Between 1935 and 1939, a total of 19 quick-freezing fish fillet plants were completed and put into operation. In the six years that followed, 1940-45, an average of more than eight fish freezing plants a year were erected. At the end of 1944, Iceland had 62 such plants in operation, with a total processing capacity of 630 metric tons of fish per 24-hour day.

The nature of the markets available to Iceland has, to a great extent, determined the mode of preparation followed by the industry. Prior to 1939, most of the Icelandic cod catch was salted and dried and prepared as klipfish for sale in the markets of Portugal, Italy, Spain, Brazil, and Cuba. Great Britain, France, and Argentina also were purchasers of this salted fish. Similarly, the greater portion of the herring catch was barrelled and cured for sale to Sweden. Only small quantities of white fish were marketed in fresh and frozen form before the war.

The war shut off the markets for salt fish in the Latin European and Latin American countries due either to blockade or lack of shipping and widely expanded the fresh and frozen fish market in Great Britain. The resulting changes rendered in the mode of preparation of white fish for market by the Icelandic fisheries were significant and are reflected in the following table.

Preparation of Iceland White Fish
(In metric tons of gutted fish)

Mode of preparation	1941	1942	1943	1944	1945 (11 mos.)
Fish on ice	118,320	151,897	162,273	179,035	150,793
Fish frozen	11,636	24,358	31,833	55,207	58,679
Stockfish	2,920	879	1,183	1,328	1,834
Salted fish	64,407	12,681	4,084	3,701	3,223

In 1935, dried salt fish exports amounted to 38,861 metric tons (85,674,000 pounds). In 1944, the yearly exports of this product had fallen to 39 tons (86,000 pounds). Wet salted fish exports fell from 14,844 metric tons (32,725,000 pounds) in 1935 to 1,253 tons (2,762,000 pounds) in 1944. Meanwhile, fresh and frozen fish exports multiplied more than 10 times in the 10-year period.

The current period is a crucial one for Iceland's fishing industry. The war is over and the British, Scandinavian, and other European fishermen are returning in increasing numbers to the sea. Iceland's all important market in Britain appears to be dwindling rapidly. Already, Britain has halted all purchases of Icelandic frozen fish fillets. New markets of any size to replace the loss of the British market have not yet been found.

The Icelandic Government has recently made attempts to sell fresh and frozen fish in quantity to France, Belgium, the Netherlands, Denmark, Switzerland, Poland, Czechoslovakia, Finland, and the Soviet Union. An effort is even being made to sell fish to occupied Germany. Little has as yet resulted from these tries. Several boat loads of fresh fish were landed in Belgium but payment was not received and landings ceased. France took 2,513 tons of frozen fish but gave no guarantee about the extent of future purchases.

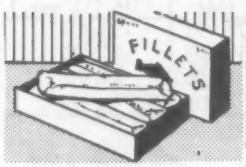
A maximum commercial market exists for Icelandic cod-liver oil in the United States and other countries. The small amount of canned goods put out by Iceland's fish canning industry is also being consumed to the full capacity of the industry by the United States market and will very likely continue. However, it is questionable whether Icelandic fresh and frozen fish are saleable in any quantities at the present time outside of some of the devastated countries in Southern and Central Europe who may neither be able to pay in stable currency nor in manufactured goods.

Proposals have been made by certain factions in Iceland to sell fresh fish on ice and frozen fish fillets to Central European countries on credit. These are

being carefully examined by the Iceland Government. Moreover, it is feared that the instability of the currencies of some of these countries would make any such deals very risky. Monies received in the future against the present loans may be greatly decreased in value.

Another course open to the Icelandic fisheries is to revert to the production of wet and dry salted fish. The Latin European and Latin American demand for the product is said to exist in the same proportions as in prewar days. But, the Icelandic producers would accept such a course only as a last resort because the income from sales of salted fish can in no way match the returns on fresh and frozen fish. Perhaps the fresh fish producers will accept a return to the salt fish markets sooner than will the frozen fish producers. The country's 62 freezing plants represent a $10,000,000 capital outlay that few would let slip into bankruptcy without a protracted struggle.

There are elements who look to developing a market for Icelandic frozen fish fillets in the United States. They have been encouraged in this idea by the fact that several American frozen fillet distributors have recently showed an interest in buying Icelandic frozen fillets to meet their volume of orders currently unfillable by American producers. One New England firm alone expressed an interest in buying several hundred thousand pounds of Icelandic frozen fish fillets. These may only be interim purchases by United States firms where an expanding frozen fillet industry may eventually be able to take care of the entire demand. On the other hand, it may be the start of the development of a new marketing outlet for Iceland frozen fillet production.



A number of speculations are current but unless Iceland can very soon find ample markets for her frozen fish, the industry will have to close down and unless future fresh fish markets are assured, the fisheries will of necessity have to revert to salting and drying and in turn accepting the lower prices that the salted product commands in the Mediterranean and Latin American markets.

Ireland

While Ireland's 1944 sea fish catch (exclusive of shellfish) was the best in six years, the country's inland fishing proved less satisfactory, according to a report on Ireland's sea and inland fisheries for the year 1944, recently transmitted to the State Department by the American Consulate General at Dublin, Ireland.

The 1944 sea fish catch (exclusive of shellfish) totaled 34,370,000 pounds, valued at $2,068,000 compared with 31,130,000 pounds in 1943, valued at $2,059,000. The quantity and value of the catch for the years 1939-44, (converted from hundredweights and pounds sterling) were as follows:

Year	Quantity	Value	Year	Quantity	Value
	Pounds	Dollars		Pounds	Dollars
1939	21,050,288	790,682	1942	28,302,736	1,747,610
1940	25,172,560	1,077,952	1943	31,126,032	2,059,209
1941	30,888,816	2,014,613	1944	34,369,328	2,067,644

The value of the shellfish catch in 1944 amounted to $454,000 compared with $402,000 in 1943. This, added to the value of other types of sea fish, brought the total for all classes of sea fish landed in 1944 to $2,522,000, stated to be the highest figure for the past 25 years. With the use of deep-sea trawlers, fishermen from Dublin and Howth Counties were responsible for the highest returns in point of value.

Shellfish continued to provide a source of income for coastal communities. The 1944 return exceeded that for 1943 by 13 percent which, in turn, exceeded that of 1942 by approximately 40 percent. Lobsters, scallops, periwinkles, oysters, and mussels were the chief varieties. Mussels in considerable quantity were exported in 1944 from Dundalk Bay and the Boyne district, presumably for use as bait. The Irish Sea Fisheries Association, in 1944, undertook the marketing of frozen scallops as an experiment, dispatching the product to market in waterproof cartons. This undertaking resulted in the trebling of the scallop catch in Connemara in 1944, as compared with 1943. Although the value of periwinkles and mussels declined in 1944, the oyster catch was double that for 1943, with the main increase in the Galway Bay area. Because of the prevailing high prices, there was a tendency to neglect the conservation of natural stock, with resulting damage to the oyster beds.

The 1944 catch of demersal fish, amounting to 15,650,000 pounds, showed a 21 percent increase over 1943 and was the highest recorded for 23 years. The herring catch for 1944 was, except for 1941, the highest yield since 1929. Mackerel landed, although less by approximately 1,120,000 pounds than the 1941 catch, represented the second largest catch for the past 15 years.

Personnel engaged in the sea fishing trade totaled 9,879 men in 1944 (1,925 whole time and 7,954 part time) against 9,646 in 1943. Vessels engaged numbered 3,439 in 1944 against 3,387 in 1943.

Fish marketed by the Irish Sea Fisheries Association in 1944 amounted to 6,160,000 pounds against 6,190,000 pounds in 1943, with payments to members totaling $510,000 in 1944 compared with $552,000 in 1943. In 1939, 1,550,000 pounds were marketed, with $85,000 disbursed to members of the Association.

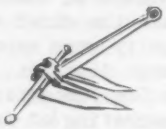
The return from fresh-water operations in 1944 was stated to be disappointing. With the exception of eels, capture of other types of fish was small, salmon and trout yields being the lowest for the past six years. The bulk of the salmon and sea trout catch is usually exported, although home consumption has increased since 1942. Exports of salmon and sea trout since 1939 have been as follows:

Year	Quantity	Year	Quantity	Year	Quantity
	Pounds		Pounds		Pounds
1939 ...	1,438,976	1941 ...	2,881,984	1943 ...	1,895,712
1940 ...	1,662,192	1942 ...	2,399,824	1944 ...	1,240,512

Quantity and value of the 1944 fresh-water catch is not included in the annual report, but the December 1944 trade statistics of the Department of Industry and Commerce show that fresh-water fish valued at $759,000 were exported in 1944. Exports of sea fish were valued at $1,899,000.

Approximately 6,300 men were employed in 1944 in various phases of the salmon fishing industry.

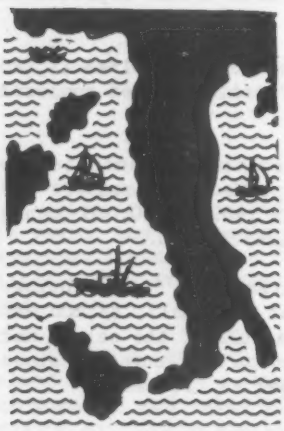
Average prices per hundredweight for fish realized by fishermen have shown steady increase during the war years. In 1938, a hundredweight (112 pounds) of herring averaged $1.36; in 1944, $4.23. Mackerel realized $2.52 in 1944 compared with $1.44 in 1938 and $1.24 in 1935.



Italy

Information regarding an Italian project for development of their postwar ocean fishing industry was received by the State Department on February 20, 1946, from the U. S. Embassy at Rome, Italy. Excerpts follow:

It is Italy's desire to rehabilitate her ocean fishing industry to the level attained before the war and to extend the industry to such an extent that the fish and fishery products will supply an important part of the Italian diet.



According to the Embassy's report, 25 Italian vessels, with a total gross weight of 11,809 tons, a total fish-carrying capacity of 4,640 tons, and an average annual import capacity of 21,000 tons, were operating before the war, fishing in the waters off Mauritania and Newfoundland. In September 1945, only four of these vessels were capable of operating and only four other vessels of the fleet could be salvaged and put into operation in 1946. This fleet of eight vessels could obtain for Italy about 10,700 tons of fish annually, or about half the prewar average.

To rebuild the fleet to its prewar capacity, plus a margin for expansion of about one-third, it is estimated that nine additional vessels of 800 gross tons, and one vessel of 3,000 gross tons would be required.

A plan for establishing a fleet that could bring a million tons of fish to Italy annually, instead of the 21,000 tons brought in from Atlantic waters before

the war, is presented as a possible solution to Italy's ever-present and acute shortage of protein foods. However, consumption of a million tons of fish annually in Italy would require a per capita consumption of about one pound per week. This is still less than is consumed in certain other European and oriental countries, but far more than now consumed in Italy. The Italian Committee for the Study of Ocean Fishing hopes to interest private American capital in these plans. Presumably, American participation would provide the vessels, or funds to purchase the necessary vessels and perhaps a certain quantity of refrigeration and other equipment not available in Italy.

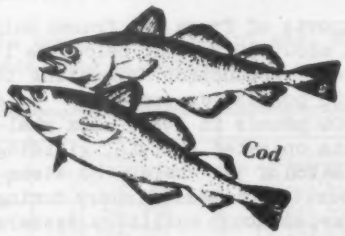
Mandated Islands

The Chairman of the Board of the Reconstruction Finance Corporation announced, on April 16, that the long-projected economic survey of the former Japanese mandated islands of the Central Pacific will become a reality late in April when the survey vessel furnished by the Navy sails from Pearl Harbor for Truk. Before returning to Honolulu in the middle of August, the scientists and economists on board the survey ship and others assigned to groups of islands will have visited every major island in the Caroline, Marshall, and Mariana groups. The results of their investigation and study will be incorporated later into a comprehensive report for the guidance of future administrators.

The broad purpose of the survey is to determine the extent of the economic resources of the islands and to make specific recommendations as to how such resources may best be utilized in the interest of native populations. The Fish and Wildlife Service is represented on the survey party by Mr. Robert O. Smith.

Newfoundland

In a report to the State Department dated March 13, 1945, the American Consulate General at St. Johns, Newfoundland, discussed the cod fishery, Newfoundland's dominant industry.



The report states, in part, as follows:

For a time during the war, newsprint superseded the cod fishery from the export angle, as large numbers of men turned from the fisheries to join the armed services and to engage in work on American and Can-

adian military bases in Newfoundland. During the last two years, however, this trend has gradually been reversed, and in 1945, fisheries again constituted the leading export industry. Approximately 24,700 men engaged in the cod fishery in 1945, an increase of about 10 percent over 1944.

The value of fishery exports in 1944-45, for the first time in Newfoundland's history, exceeded the $20,000,000 mark.

The estimated quantity of codfish salted during 1945 was 106,984,000 pounds, an increase of 1,618,000 pounds over 1944. This may be broken down as follows:

Inshore fishery - 71,848,000 pounds **Deep-sea fishery - 14,295,000 pounds**

Labrador fishery - 20,841,000 pounds

Exports of salt codfish during 1945 amounted to 120,321,000 pounds compared with 94,340,000 pounds in 1944, an increase of nearly 30 percent. Shipments to Spain, Puerto Rico, Portugal, Jamaica, and for relief, accounted for nearly 78 percent of total exports. Shipments to Spain increased over 16 million pounds, and for relief, over 8 million pounds, thus accounting for practically all of the 1945 increase. Exports to the United States showed little change.

During 1945, fishermen received prices equal to and, in some cases, in excess of 1944. The inshore fishery was marked by a record fall fishery, the Labrador fishery was relatively unsuccessful, and the deep-sea fishery was the best of the century.

One of the most encouraging aspects of the Newfoundland fisheries is the continued growth of the frozen codfish industry. During 1945, 44 filleting plants and 15 freezing plants were operated. The production of frozen cod fillets in 1945 was 30,851,000 pounds as compared with about 24,000,000 pounds in 1944. Exports of fresh and frozen cod fillets in 1945 amounted to 33,881,000 pounds. These exports went largely to the United Kingdom (57 percent), Canada, and the United States. But it is the United States to which Newfoundland is hopefully looking as a potentially permanent market for this product--as it is generally conceded that the British market will greatly diminish.

The production of herring in 1945 amounted to 219,405 barrels (225 pounds each) compared with 106,497 barrels in 1944. More than half of this production was shipped to the United Nations Relief and Rehabilitation Administration and the Foreign Economics Administration, such relief shipments representing a value of over 2 million dollars.

Exports of fresh and frozen salmon during 1945, amounting to 1,596,000 pounds, dropped about 50 percent below the 1944 exports. The lobster catch was exceptionally good, production amounting to 2,622,000 pounds as compared with 2,293,000 pounds in 1944. Six whaling boats operated in 1945, yielding a total catch of 393 whales. No steamers prosecuted the seal-fishery during that year, although auxiliary vessels and landsmen were responsible for a substantial catch. Exports of seal skins in 1945 amounted to 49,005 skins.

Exports of fishery oils for 1944 and 1945 were closely similar, except for herring oil, which showed a sharp decrease. This was due to the destruction by fire of the Newfoundland dehydrating plant on the West Coast.

During the war period, there was an assured demand for Newfoundland's codfish and herring, and the immediate outlook is for another highly successful season in 1946.

Norway

Norway's fish catch already has been reported unusually favorable this season, even approaching record proportions in some operations, according to a report dated March 20, received by the State Department from the American Embassy at Oslo, Norway.

Norwegian whaling expeditions in the Antarctic likewise report good results, with assurance that the season's production of whale oil will approximate close to 83,000 metric tons (about 23,700,000 gallons).

Spain

A report on Spain's fisheries, dated March 13, 1946, has been received by the State Department from the Consulate General at Barcelona, Spain. Excerpts from the report follow:

No shore plants for preparation of cod exist either at Bilbao, Santander, or Gijón. It is reported that the three large shore plants for cod are located at Pasajes, El Ferrol, and Vigo.

A captain of one of the cod fishing boats, who resides in a suburb of Bilbao, reports that the past season was unfortunate due to the inefficiency of the vessels, which resulted in an early return and, consequently, a smaller catch.

The total catch during 1945 from ports in the Bilbao district was, according to Provinces, as follows (converted from pesetas and kilograms):

Province	Quantity	Value
	Pounds	Dollars
Oviedo	56,153,058	6,008,301
Santander	24,116,435	1,903,510
Vizcaya	41,296,578	4,240,627
Total	121,566,071	12,152,438

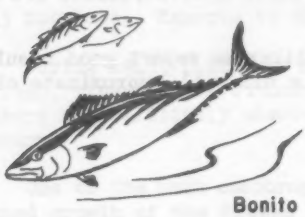
The total catch from Asturian ports in 1945 was 56,036,000 pounds, valued at $6,008,000. The fishing fleet consisted of 134 vessels, plus 387 gasoline motor boats and 81 boats powered with gas-oil engines. This made a grand total of 602 craft of all kinds.

Gijón is the most important fishing port in the Province of Oviedo. The Chamber of Commerce in that city provides the following data:

The catch out of Gijón in recent years has been as follows:

Year	Quantity	Value	Year	Quantity	Value
	Pounds	Dollars		Pounds	Dollars
1942	-	2,318,893	1944	18,681,902	2,292,467
1943	14,457,923	1,779,748	1945	21,967,256	2,966,256

It is stated that bonito is always the most important catch out of Gijón; in 1944, it amounted to 5,424,000 pounds.



Bonito

As of July 1945, there were 42 fish-packing plants operating in the Gijón district. Olive oil is consumed in those plants at a rate of 2,640,000 pounds annually.

During the latter part of 1945, there were heavy catches of hake off Ireland and off France. The season for bonito is also said to have been important. Inshore fishing, on the other hand, is reported to have been very poor and resulted in many vessels returning almost empty. This affected particularly the catches of pescadilla, sardina, and anchoa.

The total catch from ports in Santander Province during 1945 was 24,066,000 pounds, valued at $1,904,000. This represents a decrease in quantity of 5,864,000 pounds, or 19.6 percent, from the 29,930,000 pounds caught in 1944.

The catch from ports in Vizcaya Province during 1945 totaled 41,210,000 pounds, valued at $4,241,000. This represents a very small decline of 141,000 pounds, or 0.3 percent from the 1944 catch of 41,352,000 pounds, but a greater decline in value of $193,000, or 4.3 percent from the 1944 figure of $4,433,000.

Olive oil consumption in the industry tends to fluctuate with changes in quantity exported to the United States, where olive oil is particularly in demand. On the other hand, very little of the olive oil pack is shipped to Italy, which is normally also an important export market.

It is reported that the following shipments of fish were made to the United States during 1945, from the Provinces of Vizcaya, Santander, and Oviedo:

Month	Weight	Value	Month	Weight	Value
	Pounds	Dollars		Pounds	Dollars
January	231,816	78,782.72	July	262,607	66,533.87
February	454,446	113,797.01	August	14,149	3,341.08
March	113,646	27,929.80	September	287,323	79,965.44
April	272,671	72,928.26	October	358,809	89,643.89
May	4,850	3,616.44	November	143,695	34,389.49
June	-	-	December	112,738	31,415.55
	1,077,429	297,054.23		1,179,321	305,289.32

Export prices have tended to rise during 1945 for anchovies. Quotations of Vizcayan packers may be taken as typical since they are the heaviest shippers. December prices were 24.8 to 29.0 cents per pound with the majority of offerings at 27.9 cents.

With respect to the future of the fish packing industry, the most important recent development, undoubtedly, has been the framing of the Spanish-Italian commercial agreement which went into effect on January 10, 1946. It provides for exportation of considerable fish to Italy and will prove a great boon to the anchovy packers in this region in particular.

KIPPERED HERRING

Kippered herring and similarly smoked fish, sold almost universally, are partially cooked when sold so that the required home cooking is little more than thorough heating. There is some waste in this fish, which must be considered when buying.

2 pounds kippers
4 tablespoons melted butter
Cooking oil or fat
Juice of one lemon
Pepper

Split fish without breaking the back skin. Place skin side down in a single layer on an oiled pan, brush with butter and lemon juice, season with pepper if desired, and bake about 10 minutes in moderate oven (350° F.).

FEDERAL LEGISLATION, DECISIONS, ORDERS, ETC.

Department of Agriculture

FATS AND OILS: The United States Department of Agriculture announced on April 12 changes in WFO-42 affecting the packaging of shortening, cooking and salad oil, and the canning of fish.

Under Amdt. 25, effective on April 1, 1946, canners of tuna, bonito, yellowtail, and sardines have access only to soybean oil on an ex-quota basis. Formerly, some cotton and peanut oil, as well as soybean oil, were used in canning these fish. The needed oils were furnished from a special allocation. Recent shrinkage in supplies makes it necessary to discontinue the ex-quota arrangement for packing fish in these other oils.

Canners of these fish also are restricted to a 30-day inventory of soybean oil, but a canner may accept delivery of his customary shipping quantity if his supply is smaller than his 30-day requirements.

CANNED FISH SET-ASIDE: On April 4, the United States Department of Agriculture announced that canners of all species of salmon--except king, chinook or spring, and steelhead, and blueback or sockeye, packed in the continental U. S.--will be required to deliver to the Government 33 percent of their pack from April 1, 1946 to March 31, 1947, inclusive, and canners of pilchards, Atlantic sea herring, Atlantic mackerel, and Pacific mackerel will be required to deliver 45 percent of their pack during the same period.

The new percentages are contained in Amendment 18 to WFO-44, which restricts domestic deliveries of canned fish. The action by the Department of Agriculture is based on a need for canned fish for Government, military, and relief purposes during the 1946 pack year.

Amendment 18 also contains a provision limiting the amount of vegetable oil which tuna canners may use as follows:

> Unless otherwise authorized by the Assistant Administrator, no canner may use, in the production of his 1946 pack of class numbered 10 (designated in (b) (1) hereof) a quantity of vegetable oil in excess of the following applicable quantity per case of 48 cans of the size stated:
>
> TUNA—YELLOWTAIL—BONITO
>
> (a) *Solid pack*
>
> No. ½ tuna can (307 x 113), 4.1 pounds of oil per case.
>
> No. 1 tuna can (401 x 205.5), 5.6 pounds of oil per case.
>
> Four-pound tuna can (603 x 408), 7.5 pounds of oil per case.
>
> (b) *Flakes, shredded, or grated*
>
> No. ½ tuna can (307 x 113), 3.00 pounds of oil per case.
>
> No. 1 tuna can (401 x 205.5), 4.25 pounds of oil per case.
>
> Four-pound tuna can (603 x 408), 5.50 pounds of oil per case.

Government needs for canned fish of all types included under WFO-44 are expected to be about the same as last year. However, it is estimated that the total 1946 pack will be about 70,000,000 pounds greater than the 1945 pack and domestic consumers will get a total of about 480,000,000 pounds of all types of canned fish during 1946 as compared with 410,000,000 pounds last year.

Civilian Production Administration

TIN CONTAINERS: Changes in the permitted uses of tin mill products in containers were announced by the Civilian Production Administration on April 23 to bring the provisions in line with changing industrial conditions. No over-all relaxations in the use of tin mill products have been allowed in the amended provisions because of the short supply, CPA said.

The modifications were accomplished through an amendment to the container order (M-81).

Important changes in the order include:

Allowing packers their choice of using 1941 or 1945 as a base period for calculating their 1946 packing quota. Prior to this amendment, quotas were predicated on the cans used during 1945 only.

Food products of a seasonal and perishable nature which heretofore were restricted to a monthly use of not more than ten percent of the annual quota, may now be packed unrestricted by monthly percentages.

The base period for quotas on frozen foods, except frozen cherries, has been changed from 1944 to 1945. The base period on the latter is still 1944.

Department of the Interior

HALIBUT ALLOCATION: On April 5, the Office of Economic Stabilization issued an order authorizing the Secretary of the Interior to allocate halibut among the water front dealers on the Pacific Coast. Similar authority was exercised by the Department of the Interior in 1945.

HALIBUT ALLOCATION: Secretary of the Interior J. A. Krug announced on April 23 that the halibut allocation plan in effect last year will be continued during the new season.

The continuance of the plan was made necessary, he announced, because of the maintenance of price ceilings on this species of fish. The purpose of the order is to prevent violations of maximum price regulations between fishermen and dealers and to assure the orderly marketing of halibut within the regular channels of primary distribution.

Last season, the order was administered by the Office of the Coordinator of Fisheries, a wartime agency, which has now gone out of existence. This year, the Fish and Wildlife Service will administer the allocation plan.

Secretary Krug said that the plan was being continued after full consultation with the industry.

The order provides for the establishment of a new category of dealers west of Cape Saint Elias, bona fide facilities for landing halibut recently having been established there.

Office of Price Administration

AIR TRANSPORTATION: Special provisions for recovery of transportation costs by wholesalers or retailers who sell fresh fish or seafoods received by air were announced on April 16, by the Office of Price Administration. These provisions are being established in response to numerous requests from air carrier businesses, many of which are conducted by World War II veterans, the agency said.

At the same time, the agency announced new container differentials on cellophane- and parchment-wrapped frozen fish packed in three- and four-pound wood or paper containers. These container sizes previously have not been listed in the regulation.

The first action permits a wholesaler to add to his ceiling prices either the actual aerial transportation cost or 42 cents per ton mile, whichever is lower. The retailer, however, is permitted to add the transportation cost or 42 cents to his net cost for the item.

(Forty-two cents per ton mile is being used by the fresh fruits and vegetables industry, which has been pricing aerial transportation shipments on an experimental basis for nearly a year. This amount will be used by the fish industry pending the outcome of further experiments.)

The agency said that very little airborne fresh fish or seafood will be sold at retail. Most of it will be bought by hotels and restaurants in large quantities. For the small amount that may be sold at retail, however, prices will be higher than for other fresh fish and seafood. For fresh fish or shrimp, for example, brought by air 1,000 miles inland from the Gulf of Mexico or from the East or West Coasts, consumers probably would pay five to six cents a pound more than for the same products handled by other transportation methods. For the amount that will be sold at retail, OPA issued Amdt. 9 to RMPR-507--Fresh and Frozen Fish and Seafood Sold at Retail--also effective on April 20.

In order to receive their transportation allowance, OPA stated that the wholesaler and retailer must fulfill certain packaging and labeling requirements. They are:

1. The product must be shipped in packages which are labeled or marked to show they were shipped by air.
2. The labeling, packaging, and marking must be done before shipment.

In addition, within 24 hours after each sale, all sellers, other than retailers, must file a report of the sale with the OPA district office in their area. The report must include details of the sale, such as date, names and addresses of seller and buyer; quantity, size and style of dressing of the item sold; type, size and net weight of each package sold; number of packages sold; number of airline miles in the flight, and the cost of transportation.

These precautions are necessary, OPA said, to prevent sales of rail or truck-borne fresh fish or seafood at the higher ceiling prices permitted for airborne products.

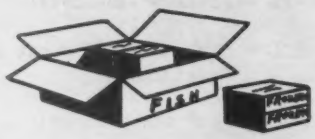
The action also restricts the transportation cost allowance of frozen fish and seafoods to common carrier truck or rail rates, whichever is higher, since there would be no advantage to the consumer (except in the saving of time) in receiving such non-perishable items by air.

OPA explained that aerial shipments of fresh fish and seafood still are in the experimental stage. The industry is studying the effects of temperature changes on fresh fish and seafoods while awaiting cost data and the effects on the items of the various types of flight conditions involved in year-round operations.

The new container differentials (amounts that may be added to the ceiling price of packed frozen fish to compensate for the cost of the container) announced on April 16 are as follows:

1. Parchment-wrapped in 3-pound wood or paper box--add 1 cent a pound.
2. Cellophane-wrapped in 3-pound wood or paper box--add 1¼ cents a pound.
3. Parchment wrapped in 4-pound wood or paper box--add ¾ cent a pound.
4. Cellophane-wrapped in 4-pound wood or paper box--add 1 cent a pound.

Under previous actions, differentials have been established for one-, two-, five-, ten-, and 15-pound containers.



Under the action, ceiling prices for parchment- and cellophane-wrapped frozen fish in three- and four-pound containers are provided in line with ceiling prices for similarly wrapped fish in one-, two-, and five-pound containers.

The agency stated that where frozen fish is wrapped in containers up to five pounds, and are sizes not listed in the regulation, the differential for a listed package of the same type as well as the nearest weight, may be added.

However, for unlisted weights (3½ pounds, for example) falling equally between two listed weights (3 and 4 pounds, in this case), the weight with the lower differential must be taken.

Differentials vary according to the type of wrapping and size of container, OPA said. The new action is the result of experiments being carried on by many fish processors with different sizes of containers not usually used in the industry.

Amdt. 51 to MPR-418--Fresh Fish and Seafood; Amdt. 18 to MPR-579--Certain Species of Fresh and Frozen Fish and Seafoods; and Amdt. 35 to MPR-364--Frozen Fish and Seafood; all became effective on April 20, 1946.

RECENT FISHERY PUBLICATIONS

Listed below are informational publications which recently have been processed by the Division of Commercial Fisheries. With the exception of the FL series, these may be obtained, free of charge, from the Division of Commercial Fisheries, Fish and Wildlife Service, Washington 25, D. C. FL publications are available from the Fish and Wildlife Service, Merchandise Mart, Chicago 54, Illinois.

Number	Title
CFS-253	- Vitamin A Report, December 1945
CFS-255	- Current Fishery Trade, December 1945
CFS-256	- Fish Meal and Oil, January 1946
CFS-258	- Fish Meal and Oil, February 1946
CFS-259	- Current Fishery Trade, Annual Summary
CFS-260	- Canned Oysters, 1945
CFS-261	- Frozen Fish Report, April 1946
FL-106 (Revised)	- How to Cook Fish
FL-173	- Agar and Other Seaweed Gums: A Summary of Data on Chemical and Physical Properties
FL-180	- Home Canning of Fish
FL-184	- The Chesapeake Bay Soft Crab Industry
MDL-3 (Revised)	- Tennessee Frozen Food Locker Plants
MDL-27(Revised)	- Louisiana Frozen Food Locker Plants

Designations for fishery publications are interpreted as follows:

CFS - Current fishery statistics of the United States and Alaska.

SL - Statistical lists, consisting of lists of dealers of fishery products and manufacturers of byproducts.

FL - Fishery leaflets.

MDL - Market development lists of frozen food locker plants and locker associations.

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